SITE: Alaric Area GW Plume
BREAK: 8.6
OTHER: v.1

US Army Corps of Engineers
Jacksonville District

Superfund Five-Year Review Report

Alaric Area Groundwater Plume Site

Tampa, Hillsborough County, Florida

Prepared for
U.S. Environmental Protection Agency, Region 4
May 2008

10532975

FIVE-YEAR REVIEW REPORT

Five-Year Review Report
for
Alaric Area Groundwater Plume
Tampa
Hillsborough County, Florida

May 2008

PREPARED FOR:

United States Environmental Protection Agency
Region 4
Atlanta, Georgia

Approved by: **Date:**

Franklin E. Hill
Director, Superfund Division
U.S. EPA, Region 4

5/15/08

Five-Year Review Report
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TABLES

ATTACHMENTS

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirements
bls	(depth) below land surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CES	Concrete Equipment Suppliers, Inc.
CIC	Community Involvement Coordinator
CFR	Code of Federal Regulations
COC	Contaminant of Concern
DCE	Dichloroethylene
DNAPL	Dense Non-Aqueous Phase Liquid
EPA	United States Environmental Protection Agency
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FDER	Florida Department of Environmental Regulation
FYR	Five-Year Review
GAC	Granular Activated Carbon
gpm	Gallons per Minute
GRAT	Groundwater Recovery and Treatment (system)
HAP	Hazardous Air Pollutant
HCC	Helena Chemical Company
HCPHU	Hillsborough County Public Health Unit
HRS	Hazard Ranking System
ISCO	In-Situ (or In-Place) Chemical Oxidation
IA	Interim Action
IC	Institutional Control
IRA	Interim Remedial Action
IZ	Intermediate (semi-confining) Zone
LTM	Long Term Monitoring
LTRA	Long Term Response Actions
MCL	Maximum Contaminant Level
MSL	Mean Sea Level
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NGVD	National Geodetic Vertical Datum
NPL	National Priorities List
O&M	Operations and Maintenance
OMM	Operations, Monitoring & Maintenance
OSWER	Office of Solid Waste and Emergency Response (EPA)
PCE	Perchloroethylene (a.k.a. tetrachloroethylene)
PP	Proposed Plan
ppb	parts per billion
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation

RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
SCA	Sweeping Corporation of America
Shaw	Shaw Environmental and Infrastructure, Inc.
SVI	Soil Vapor Intrusion
TBC	Tampa Bypass Canal
TBD	To be determined
TCE	Trichloroethylene
UAO	Unilateral Administrative Order
ug/L	micrograms per liter
USACE	United States Army Corps of Engineers
VI	Vapor Intrusion
VOC	Volatile Organic Compound
VOH	Volatile Organic Halogen
WTP	Water Treatment Plant

Executive Summary

The U.S. Army Corps of Engineers, Jacksonville District (USACE), on behalf of the U.S. Environmental Protection Agency, Region 4 (EPA), has conducted the first Five-Year Review of the remedy implemented at the Alaric Area Groundwater Plume Site (Alaric, Alaric Site, or the Site) in Tampa, Florida. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act, and Section 300.430 of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), requires that periodic reviews be conducted for sites where hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following the completion of all remedial actions. The purpose of the Five-Year Review is to determine whether remedial actions taken at a Site are protective and will remain protective of human health and the environment.

This is the first Five-Year Review for the Alaric Site. The trigger for this statutory review is the passage of five years since initiation of the first remedial action at the Site. For the Alaric Site, the EPA WasteLAN database records the first remedial action as beginning on March 31, 2003.

The basis for taking action at the Alaric Site is a plume of groundwater contamination of perchloroethylene (PCE) and other chlorinated solvents originating beneath the one-acre Alaric property. Progressive investigations have revealed that the plume had migrated from the source property onto four adjacent properties, and extended to a depth of 70 feet, into the intermediate water-bearing unit. Today, trace concentrations of site-related contaminants are being detected in the Upper Floridan aquifer, which is a major source of drinking water in the Tampa area.

On July 23, 2002, EPA Region 4 issued an Interim Action Record of Decision (IA ROD) for the Alaric Area Groundwater Plume Site. Remedial Action Objectives identified in the IA ROD were to: (1) treat and reduce concentrated source materials below the water table to a total chlorinated volatile organic compound (VOC) concentration ranging from 100 micrograms per kilogram (μg/kg) to 1,000 μg/kg; (2) remove VOC contaminated soils in the unsaturated zone in the area of the septic system drain field; (3) collect, treat, and dispose of VOC contaminated groundwater, and (4) perform this work in a manner compatible with groundwater remediation planned for the adjacent Helena Chemical Company (HCC) Superfund Site. At a future date, EPA will issue a final Record of Decision (ROD) for the Alaric Site to authorize a final or permanent remedy, addressing all actions needed to assure long-term protection of human health and the environment.

The goals of the Interim Remedial Action (IRA) were to remove as much contaminant mass overlying the confining Hawthorne clay layer as technically practicable and to control the spread of the groundwater plume until a final remedy could be implemented. Since the bulk of contaminated soil is below the water table, the interim action was proposed to reduce future loading of VOC contaminants from the source materials into the groundwater, thus improving performance of the groundwater remedy and reducing the period of time needed for the final remedy to achieve Federal and State groundwater standards. The IA ROD stated: "The groundwater pump and treat system will be operated a *minimum of five years, enough time to assess the effects of the source* remediation and the pumping and treating of groundwater on the overall reduction of groundwater contaminants to within Federal and State MCLs."

Issues and Recommendations: One major issue was identified. The remedy selected to address soil contamination, in-situ chemical oxidation (ISCO), has not attained the acceptable range of Soil Cleanup Target Levels (SCTLs) at several locations in the source area. As a result, loading of chlorinated VOCs into the groundwater continues to occur. The recommended actions, in accordance with the IA ROD, are that EPA consult with FDEP (and the remediation contractor), review available data, and determine if a third round of ISCO treatment is justified. If a third round of treatment is attempted but does not attain the required SCTL range, or if the consultation concludes that further ISCO treatment is not justified, the recommendation is to evaluate other alternative remedies, including additional excavation.

Several issues of lesser concern have been identified. Recommendations and suggested follow-up actions have been generated to address these concerns. Additional information regarding all issues, recommendations, and follow-up actions can be found in Sections VIII and IX of this report.

Protectiveness Statements:

Protection of Human Health

Short-Term

The remedy at the Alaric Area Groundwater Plume Site currently protects human health and the environment because human exposures are not occurring. The inhalation pathway for VOC contaminants released as exhaust stack gases from the groundwater recovery and treatment system has been evaluated, and has been determined not to pose a human health problem. In addition, possible consumption of contaminated groundwater has been addressed through a potable well survey conducted in 1986. The survey found that all users in the affected area were connected to a safe, public water supply system. The nearest surface water body is the Tampa Bypass Canal, which is located about 2,000 ft. to the east and about one mile to the southwest. Sampling results from the ongoing groundwater monitoring program indicate that, for the unconfined surficial aquifer and the intermediate semi-confining zone, the contaminant plumes extends less than 500 ft. from the Site's source area. Site-related contaminants have not been detected above MCLs in the Floridan aquifer since August 2000.

Long-Term

The IA ROD is not intended to provide long-term human health protection. Rather, the intent of the IA ROD is to contain groundwater contamination and reduce contamination concentrations in subsurface soil, setting favorable conditions for a permanent remedy to be effectively implemented. A final ROD will establish final clean-up goals, thereby assuring future, long-term protectiveness of human health. However, in the interim, institutional controls, designed to prevent direct exposure of humans to contaminated soil resulting from new excavation/construction, as well as to prohibit the consumption of contaminated groundwater should be evaluated and implemented, as appropriate.

Protection of the Environment

Short-Term

The IA ROD does not establish a specific remedy with respect to protection of the environment. However, by containing the contaminant plume, the possibility of groundwater being released to rivers, lakes, or springs, where ecological exposures could occur, is minimized.

Long-Term

As with human health, the IA ROD is not intended to provide long-term protection of the environment. Rather, the intent of the IA ROD is to contain groundwater contamination and reduce contamination concentrations in subsurface soil, thus setting favorable conditions for a permanent remedy to be effectively implemented. A final ROD will establish final cleanup goals, and thereby assure future long-term protectiveness of the environment.

In accordance with CERCLA requirements, policy, and guidance, it is recommended that the next Five-Year Review for the Alaric Site be completed within five years from the signature/ approval date of this report.

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EPA Five-Year Review Summary Form

SITE IDENTIFICATION
Site name (*from Waste LAN*): Alaric Area Groundwater Plume Site
EPA ID (*from Waste LAN*): FLD012978862
Region: 4 **State:** FL **City/County: Tampa**/Hillsborough
SITE STATUS
NPL status: Final
Remediation status: In Progress
Multiple OUs? * No **Construction completion date:** 09/30/2003
Has Site been put into reuse? Yes
REVIEW STATUS
Lead agency: EPA Region 4
Authors' names: Frank Zepka
Author title: Environmental Engineer **Author affiliation:** USACE Jacksonville, FL
Review period: 01/13/2007 to 11/15/2007**
Date(s) of Site inspection: 07/18/2007
Type of review: Statutory (Post-SARA)
Review number: 1
Triggering action: Start of Remedial Action On-Site Construction
Triggering action date: 03/31/2003
Due date (five years after triggering action date): 03/31/2008

*"OU" refers to operable unit

**Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.

Five Year Review Summary Form, cont'd.

Issues:

Six issues were identified in various sections of this report. The six issues have been compiled into a single table in Section VIII. None of the six issues affects current, short-term protectiveness of human health and the environment. Five issues were found to affect future, long-term protectiveness, and only one of these is considered to be a major issue.

The major issue is that the remedial component to address soil contamination, ISCO, has not attained the acceptable range of Soil Cleanup Target Levels (SCTLs) at several locations in the source area. As a result, loading of the chlorinated VOCs into groundwater continues to occur.

Recommendations and Follow-up Actions:

The significance of each of the six issues is discussed further in Section IX. At the end of the section, Table 7 presents the recommendations and follow-up actions, the responsible party, the oversight agency, the milestone date, and whether or not present and/or future protectiveness is affected by each issue.

For the major issue, non-attainment of SCTLs, the recommended actions are that EPA consult with FDEP and the remediation contractor, review available data, and determine if another round of ISCO treatment is justified. (These actions are presented in the IA ROD). If a third round of treatment is attempted but does not attain the stated SCTL range, or if EPA concludes after consultation with the State and contractor that further ISCO treatment is not justified, the recommendation is to evaluate other alternative remedies, including additional Site excavation.

Protectiveness Statements:

Protection of Human Health

Short-Term

The remedy at the Alaric Area Groundwater Plume Site currently protects human health and the environment because human exposures are not occurring. The inhalation pathway for VOC contaminants released as exhaust stack gases from the groundwater recovery and treatment system has been evaluated, and has been determined not to pose a human health problem. In addition, possible consumption of contaminated groundwater has been addressed through a potable well survey conducted in 1986. The survey found that all users in the affected area were connected to a safe, public water supply system. The nearest surface water body is the Tampa Bypass Canal, which is located about 2,000 ft. to the east and about one mile to the southwest. Sampling results from the ongoing groundwater monitoring program indicate that, for the unconfined surficial aquifer and the intermediate semi-confining zone, the contaminant plumes extends less than 500 ft. from the Site's source area. Site-related contaminants have not been detected above MCLs in the Floridan aquifer since August 2000.

Long-Term

The IA ROD is not intended to provide long-term human health protection. Rather, the intent of the IA ROD is to contain groundwater contamination and reduce contamination concentrations in subsurface soil, setting favorable conditions for a permanent remedy to be effectively implemented. A final ROD will establish final clean-up goals, thereby assuring future, long-term protectiveness of human health. However, in the interim, institutional controls, designed to prevent direct exposure of humans to contaminated soil resulting from new excavation/construction, as well as to prohibit the consumption of contaminated groundwater, should be evaluated and implemented, as appropriate.

Protection of the Environment

Short-Term

The IA ROD does not establish a specific remedy with respect to protection of the environment. However, by containing the contaminant plume, the possibility of groundwater being released to rivers, lakes, or springs, where ecological exposures could occur, is minimized.

Long-Term

As with human health, the IA ROD is not intended to provide long-term protection of the environment. Rather, the intent of the IA ROD is to contain groundwater contamination and reduce contamination concentrations in subsurface soil, thus setting favorable conditions for a permanent remedy to be effectively implemented. A final ROD will establish final cleanup goals, and thereby assure future long-term protectiveness of the environment.

Other Comments:

None.

Five-Year Review Report

I. Introduction

The purpose of the Five-Year Review is to evaluate the implementation and performance of a remedy in order to determine if the remedy is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, this Five-Year Review report will identify any issues found during the review and identify recommendations to address them.

The Agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The United States Environmental Protection Agency (EPA), Region 4, has entered into an Interagency Agreement (No. DW96945988) with the U.S. Army Corps of Engineers (USACE) to conduct the Five-Year Review of the remedy implemented at the Alaric Area Groundwater Plume Site (Alaric Site or Site) in Tampa, Hillsborough County, Florida. Frank Zepka of USACE, Jacksonville District, conducted the Site visit and performed this review from July through November, 2007.

This is the first Five-Year Review for the Alaric Site. The trigger for this statutory review is initiation of the first on-site Remedial Action, the Shallow Soil and Septic System Removal. The date of this action is recorded in EPA's WasteLAN database as March 31, 2003.

As the lead agency, U.S. EPA, Region 4 formed a team consisting of the Remedial Project Manager and USACE engineering staff to conduct the Five-Year Review. The Florida Department of Environmental Protection (FDEP) is the support agency for the Five-Year Review for this Site, and has participated in the Site inspection and review of the draft Five-Year Review report.

The next Five-Year Review will be required in May 2013.

II. Site Chronology

The chronology of significant events for the Alaric Site is provided in Table 1.

Table 1: Chronology of Site Events

Event	Date
Hillsborough County Sampling of Private Well identifies Floridan Aquifer Groundwater Contamination in Orient Park	Sep 1986
City of Tampa completes installation of public water supply to affected area	Dec 1986
FDER sampling concludes source areas of groundwater contamination are surficial soils	Jan-Feb 1988
Preliminary Assessment	Sep 7, 1989
Site Inspection	Sep 10, 1991
Alaric, Inc. Site proposed for NPL listing	Feb 4, 2000
Alaric, Inc. Site formally listed on NPL	Dec 1, 2000
Focused Feasibility Study for Interim Remedial Actions completed	Jun 11, 2001
EPA completes Phase I Remedial Investigation (RI)	Aug 2, 2001
Interim Action Record of Decision (IA ROD) is approved by EPA	Jul 23, 2002
FDEP issues Letter of Concurrence for selected interim remedy	Sep 20, 2002
Remedial Design No. 1 Complete	Sep 26, 2002
AOC effective with Property Owner	Mar 18, 2003
Removal of Shallow Contaminated Soils and Septic System begins	Mar 31, 2003
Removal of Shallow Contaminated Soils and Septic System is completed	May 1, 2003
Treatability Study	Jun 30, 2003
Remedial Design No. 2 Complete	Jun 30, 2003
Construction begins for Groundwater Recovery and Treatment (GRAT)System and In-situ Chemical Oxidation (ISCO) System	Jul 2003
Construction Complete for GRAT and ISCO Systems	Sep 30, 2003
Begin operation of ISCO System using Potassium Permanganate	Sep 15, 2003
Cease operation of ISCO using Potassium Permanganate	Oct 29, 2004
Begin installation of delivery system for ISCO using Sodium Permanganate	Dec 4, 2006
Begin Phase II ISCO using Sodium Permanganate	Dec 18, 2006
Cease Phase II ISCO operations	Feb 27, 2007
Remedial Design No. 3 Complete	May 2, 2007
EPA initiates second Remedial Investigation/Feasibility Study (RI/FS)	May 2, 2007

III. Background

Physical Characteristics

The Alaric Site is located in the Orient Park area of Tampa, Hillsborough County, Florida, in an urban area with mixed commercial, industrial, and residential properties. A Site location map is provided as Figure 1 in the Attachments section of this report. The Site is comprised of the former Alaric, Inc. property, approximately one-acre in size, located at 2110 N. 71st Street, Tampa, (Figure 2) and several adjacent lots where contaminated groundwater had migrated, including a vacant three-acre lot to the south owned by Helena Chemical Company (HCC). The July 2002 IAROD indicated that the size of the Site, including the contaminant plume, was estimated to be eight acres. The population within a one-mile radius was estimated to be between 1,000 and 5,000 persons.

The Alaric Site is bound on the west by a wood products business; on the northwest by a pay telephone refurbishing company; on the east by North 71st Street and a National Priorities List (NPL) Site owned by HCC; and on the north by a masonry construction company and a battery recycling and reconditioning company. The land is generally flat, with the majority of the surface drainage flowing overland to the south and southeast, before being captured in a drainage swale along the north side of the CSX railroad tracks which border the vacant Helena lot. From the eastern portion of the Site, drainage is northward in drainage ditches parallel to 71st Street that eventually empty into the Tampa Bypass Canal (TBC).

The TBC was constructed between 1966 and 1982 by the USACE as a flood control system. The TBC generally follows the alignment of the former Six Mile Creek, which was deepened and significantly widened. At its nearest, the TBC is approximately 2,000 ft. east of the Alaric Site (see Fig 1). About one mile beyond that point, the TBC turns west before discharging into the estuary at McKay Bay. Six control structures, or dams, normally limit discharge via the TBC, but when surface flows threaten to cause flooding along the Hillsborough River, the structures are opened to provide additional flow capacity and avoid flooding in highly developed areas. The last, i.e., farthest downstream, structure along the TBC is structure S-160, which can be seen southeast of the Site on Fig 1. When different structures along the TBC are closed to impound water, the fresh surface water on the north side of S-160 can be several feet higher or lower than the tidally-influenced water on the south side of the structure. As a result, groundwater elevations and flow directions at the Alaric Site can be influenced by operations of the TBC, especially in the intermediate semi-confining zone.

Soil near the surface of the Site is characterized as undifferentiated silty sand. Typically, groundwater can be found within 30 to 40 inches below land surface (bls). Below that depth, the surficial aquifer exists as silty sand and extends to a confining clay layer, the top of which has been measured at depths which range from 9.5 to 16.0 ft bls on the Site. Beneath the clay strata, the stratigraphy transitions to a water-bearing intermediate semi-confining zone (IZ), which will be discussed below as the Upper Intermediate Zone (UIZ), ranging to a depth of ~35 ft bls, the Middle IZ (MIZ) from ~35 to 60 ft bls, and the Lower IZ (LIZ) from ~60 to 80 ft, bls. The intermediate semi-confining zone is not considered an aquifer, but rather a low-permeability, water-bearing zone; in particular, the Upper IZ is comprised of such tight clay that it is impossible to determine a flow direction. Moving downward through the Middle and Lower IZ, the flow regime can be better characterized. The Floridan aquifer exists beneath the intermediate semi-confining zone, and is the primary source of drinking water in Hillsborough County, and most of North and Central Florida.

Based on County, State, and Federal environmental investigations conducted prior to issuance of the IA ROD, a plume of chlorinated solvents was believed to originate from sources on the Alaric property, and had migrated south on to a vacant, three-acre lot owned by HCC and on to other adjacent properties. The July 2002 IA ROD indicated that the size of the groundwater plume was estimated to be eight acres. Sampling results indicated that groundwater in the surficial aquifer was highly contaminated with chlorinated solvents, and the chlorinated solvent plume extended throughout the IZ, to a depth of 70 feet bls. In 2000, trichloroethylene (TCE) was detected in the Floridan aquifer at a depth near 120 ft bls, at a reported value of 4 micrograms/liter (μg/L), which exceeded Florida's Maximum Contaminant Level (MCL) for TCE in drinking water of 3 μg/L.

Land and Resource Use

Prior to 1973, the Alaric Site was undeveloped, as was much of the surrounding area. In 1973, the present building on the Site was erected and occupied by the Florida Materials Handling Corporation, a forklift sales and service company owned and operated by Mr. Lee W. Oglesby (the former property owner and now trustee for the trust which currently owns the property).

Subsequently, other businesses were operated on the property. From 1978 to 1981, Concrete Equipment and Supply, Inc. (CES) occupied the Site, where it built, repaired, and refurbished concrete mixing equipment. CES used cleaning and degreasing agents in the repair and maintenance of equipment, and spray-down areas were reportedly located on the west and south sides of the property. It was suspected, but not confirmed, that CES applied chlorinated cleaning solvents, including perchloroethylene (PCE) and TCE to equipment on the concrete pad at the southeast corner of the building and adjacent to the septic system and drain field.

From 1981 until 1992, Alaric, Inc. operated a plastics recycling business at this location. The exact nature of the Alaric operation is unknown, but it has been reported that PCE was stored in a bulk tank on-site for the purpose of removing paints from plastics prior to recycling.

Currently, Sweeping Corp. of America (SCA) occupies the property, conducting fleet maintenance and storage of street sweeping equipment. No chlorinated solvents, hazardous materials or hazardous wastes have been associated with the SCA operation.

In September, 1986 sampling of a private well on the Alaric property by Hillsborough County identified PCE and TCE contamination of the Floridan aquifer in Orient Park. By December 1986, the City of Tampa had completed installation of public water supply to the affected area. The area continues to be served by private septic systems for waste water disposal.

The Floridan aquifer underlies the Alaric Site, and is the predominant source of drinking water in Hillsborough County and much of Florida's southern peninsula. In this area, groundwater generally flows to the southwest and west into Hillsborough Bay. Nearby users of the Floridan aquifer for public water supply are located two to three miles from the Site and include East Lake Utilities, Paradise Mobile Home Park, Florida Water Services, and the Seminole Indian Reservation. The nearest residential homes are located approximately 0.2 miles northeast of the Site and are served by municipal water supply. In September 2000, a Public Health Assessment prepared by the federal Agency for Toxic Substances and Disease Registry reported that only two potable wells were identified within 500 yards (0.28 miles) of the Site. One of these wells is the closed on-site well, and the second well was described only as being upgradient from the Site.

The nearest surface water body is the TBC, which is located approximately 2,000 feet to the east. To date, contamination from the Alaric Site has not impacted the TBC nor public water supplies. The housing in the immediate area of the Alaric Site is largely comprised of older wood-framed homes. Gradually, these homes are being bought out, and either occupied for business purposes or demolished. Overall, the immediate area is trending to increased commercial and industrial activity, with less residential presence.

History of Contamination

In September 1986, the Hillsborough County Public Health Unit (HCPHU) sampled the on-site well at the Alaric property and identified PCE and TCE contamination. Additional sampling in Orient Park found 23 additional private wells sourced in the Floridan aquifer with similar contamination. In December 1986, the City of Tampa completed installation of public water supply lines to the affected area.

A 1988 study by the Florida Department of Environmental Regulation (FDER) concluded that the Alaric surficial soils were the source of the groundwater contamination, and additional studies followed. Groundwater monitoring in the late-1990s by the Florida Department of Environmental Protection (FDEP) documented a plume of groundwater contamination several acres in size. The plume also appeared to have migrated onto an adjacent property, the Helena Chemical Superfund Site, where releases of pesticides, benzene, toluene, ethyl benzene and xylene, as well as sulfur have contaminated the soil and groundwater. Due the apparent co-mingling of plumes, the problems associated with the Alaric Site were referred to EPA by the FDEP.

During 1998 and 2000, investigations by FDEP and EPA indicated the presence of two source areas on the Alaric Site. The primary source area was located along the eastern side of the building, in the area of the septic tank and drain field. A smaller and less intensely contaminated source area was found northwest of the building.

The Alaric Site has been occupied by several businesses since the early 1970s. Operations of one of the tenants (1978-1981), CES, were suspected of causing the release of significant quantities of degreasers, including PCE and TCE. Reportedly, parts cleaning operations were conducted on the southern and western sides of the building. Although no records were found showing that CES used PCE- or TCE-containing degreasing agents, samples collected from the property indicated the presence of two source area with high concentrations of PCE and TCE in the soil.

Another tenant, Alaric, Inc., occupied the Site from 1981 until 1992 and operated a plastics recycling business at this location. The exact nature of the Alaric operation is unknown, but it has been reported that PCE was stored in a bulk tank on-site for the purpose of removing paints from plastics prior to recycling. Although CES and Alaric, Inc. may have been two generators of the chlorinated VOC contamination located on this property, available evidence has not conclusively linked either company or any other adjoining businesses to the contamination. Officially, the Site continues to be designated as the Alaric Area Groundwater Plume Site, and all actions are progressing under EPA fund-lead.

The current nature and extent of contamination at the Alaric Site are discussed under the heading Data Review in Section VI, and in Section VII, Question A.

Initial Response

The initial response to the groundwater contamination, connection of affected and potentially affected users to a safe public water supply, was completed in December, 1988. The first remedial actions to address the groundwater contamination and source materials were those selected in the July 2002 IA ROD and are being evaluated in this Five-Year Review.

Basis for Taking Action

From 1997 to 1998, FDEP conducted a contamination assessment at the Alaric Site. PCE and cis-1,2-dichloroethene (cis-1,2-DCE) were detected in subsurface soil samples collected at or below the ground water table, and PCE and its degradation products, TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride were detected in ground water samples collected from Alaric and adjacent properties. Contamination by PCE, TCE, and related compounds was documented in the surficial aquifer and Floridan aquifer beneath Alaric and adjacent facilities.

In August 2001, EPA completed a Phase I Remedial Investigation (RI) for the Site. When compared to earlier sampling results, the RI indicated VOC contamination was increasing in concentration locally, and was migrating from the Site to the southwest, south, and southeast. The remedial responses selected in the IA ROD were designed to contain the contaminant plume, and address source materials which would otherwise continue to cause loading of contaminants to the groundwater.

IV. Remedial Actions

Remedy Selection

On July 23, 2002, EPA Region 4 signed the IA ROD for the Alaric Site and identified Remedial Action Objectives (RAOs) for the Interim Remedial Action (IRA), including the following:

- Treat and reduce concentrated source materials below the water table to a total chlorinated VOC concentration ranging from 100 micrograms per kilogram (μg/kg) to 1,000 μg/kg,
- Remove VOC contaminated soils in the unsaturated zone in the vicinity of the septic system drain field and other related areas for off-site disposal,
- Contain, collect, treat, and dispose of VOC-contaminated groundwater, and
- Perform this work in a manner that is compatible with the groundwater remediation planned for the Helena Chemical Superfund Site.

The RAOs were based on the facts that contaminants had migrated from the facility and had impacted the underlying soil and groundwater comprising the surficial aquifer, and what the IA ROD described as the Upper Floridan aquifer. (Remedy implementation has led to additional investigation and data collection. Post-IA ROD reports, including this Five-Year Review, now discuss a surficial aquifer and an intermediate semi-confining, water-bearing unit known as the Intermediate Zone (IZ), which are both above the Upper Floridan aquifer.) The IA ROD stated that implementation of this IRA should reduce the amount of future loading of contaminants from the source materials to the groundwater, contain the horizontal and vertical migration of the groundwater plume, and reduce the total mass of contaminants in the groundwater. Remedial components specified in the IA ROD were not intended restore the aquifer nor to attain the MCLs.

As outlined in the IA ROD, the primary components of the selected remedy include: (a) removal and replacement of a contaminated septic system; (b) in-situ treatment of contaminated source materials below the water table using chemical oxidation to a total chlorinated volatile organic compound (VOC) concentration of 1,000 micrograms/kilogram (μg/kg) to 100 μg/kg; (c) containment of contaminated groundwater using recovery wells; (d) treatment of contaminated groundwater using air stripping with additional treatment using carbon adsorption, if needed; (e) disposal of treated groundwater at either a Publicly Owned Treatment Works (POTW) or through groundwater reinjection; and (f) long-term groundwater monitoring.

Remedy Implementation

Due to funding constraints and technological differences, the decision was made to implement the remedy established in the IA ROD as three separate components: (1) excavation, removal, and off-site disposal of the shallow subsurface soil contamination, septic tank and drain field; (2) treatment of the deeper contaminated soils below the water table using ISCO; and (3) treatment of contaminated groundwater from the surficial and intermediate aquifers by pumping and treating. The third component, groundwater treatment, also incorporates the IA ROD's selected remedial elements of plume containment, disposal of treated water, and long-term groundwater monitoring.

(1). Work on the first component began on March 31, 2003 and was completed on May 1, 2003. During this time, 562 tons of solvent-contaminated soils were excavated, categorized as non-hazardous, and disposed at a permitted landfill. Consistent with the IA ROD, the maximum depth of contaminated soil excavation was determined by the top of the water table, which generally allowed for soil to be removed to a depth of 30-40 inches bls (see Fig. 3 and attached Photographs #5 and #6). Where excavation was not constrained by the water table, the excavation achieved clean margins which satisfied FDEP's SCTLs for key indicator contaminants, including 30 μg/kg for PCE and TCE and 400 μg/kg for 1,2-DCE.

The IA ROD anticipated that the septic tank and drain field could be cleaned in place and returned to service. However, once exposed, it became apparent that the old system would not meet current building standards. The 1,000-gallon septic tank and its drain field were removed and disposed. A replacement septic system was installed to continue sanitary service to the building and its drain field was built to a higher ground elevation (60 inches above the water table) to meet current code requirements.

Prior to the work, the septic system was believed to be the main source of the chlorinated solvent plume. Later sampling of the septic tank sludge indicated only moderate levels of PCE, and none of its associated degradation products. However, confirmatory side-wall sampling from the tank excavation lead to the realization that another strong source area existed around a concrete pad at the southeast corner of the Alaric building. Further sampling beneath the concrete pad revealed VOC concentrations as high as 217 mg/kg in the unsaturated soil, and as high as 7,400 mg/kg in saturated soil at 10 feet bls. Due to the proximity of the newly-identified source to the existing building, it was determined that the more prudent approach would be to address this contamination as part of the planned ISCO for deeper contaminated soils.

(2.a). Phase I ISCO Treatment Using Potassium Permanganate:

The IA ROD's stated goal for the second remedial component, ISCO, was to reduce total chlorinated VOC contaminants in soil below the water table to concentrations ranging from 100-to-1,000 μg/kg. Target depth to achieve this remedial goal was one-foot into the clay aquitard, which is equivalent to 10-14.6 feet bls. Construction of the ISCO system began in July 2003 with mobilization to the Site, followed by installation of recovery wells in the surficial aquifer, and construction of infiltration galleries near the surface for return of treated groundwater to the surficial aquifer. In August, the oxidant injection system was installed. It included 24, one and one-half inch diameter well points placed by direct push. To target delivery of the oxidant to the soils having the greatest oxidant demand, some of the wellpoints were screened only over the lower five-feet, while others had 10-foot screened intervals to provide full depth oxidant delivery. Other elements of the oxidant injection system included a supply pump, main manifold, a direct reading totalizing flow meter with an integral flow transmitter, a pressure gauge with pressure transmitter, and a sample tap. Also in August 2003, the temporary potassium permanganate storage and mixing vessels were received and placed adjacent to the shallow source area. Final inspection of the construction occurred on September 9, 2003.

Initial operation of the ISCO system began on September 15, 2003 and ended on October 29, 2004. Exceptions to continuous operation occurred from April 29 through June 18, 2004 because of equipment malfunctions, and later due to the approach and passage of several hurricanes which caused power outages and flooding. Overall, the operational period of the ISCO system is reported as 377 days, during which time 221,500 pounds of technical grade potassium permanganate was mixed, diluted, and injected at average concentrations which began at 0.3 percent.

In July 2004, soil cores were collected across the potassium permanganate treatment area and were examined for purple coloration, indicative of permanganate contact. Groundwater samples were collected in the same areas. Water samples collected from 10 of the 14 monitoring wells in the source area that exhibited purple coloration were below FDEP's groundwater cleanup target level (GCTL) and EPA's MCL. The highest chlorinated VOC concentration in the source area monitoring wells were reported at MW-43 with total chlorinated VOC concentrations of 3,308 and 3,862 μg/L at respective depths of 4.3 and 10.8 feet bls. Results of the groundwater analysis are presented in Table 3 at the end of this report.

Review of the July 2004 data indicated that chlorinated VOC levels in the treated area of the surficial source zone had been substantially reduced. Exceptions were noted at six locations, including MW-043 and MW-6. From August through October, the potassium permanganate dosage concentration was gradually increased from 0.3 percent up to a maximum of 2.5 percent, and the injections were primarily directed at the locations which continued to exhibit contamination. On October 29 2004, the remaining on-site supply of potassium permanganate had been exhausted, and operation of the ISCO treatment was stopped. The ISCO treatment had substantially attained the target range of 1,000 to 100 μg/kg of total chlorinated VOCs in soil. As summarized in the May 2005 draft Remedial Action Report for Treatment of In-Situ Soil by Chemical Oxidation, the mean concentration of total VOCs in the upper five feet of soil was reduced from 55,778 μg/kg to 34 μg/kg, and in the soil below five feet bls, the mean concentration was reduced from 684,692 μg/kg to 28 μg/kg.

Over the operational period, 5,060,000 gallons of potassium permanganate solution were injected. Water recovered to contain contamination in the surficial aquifer was treated, and became the primary source of feed water used to mix and dilute the potassium permanganate. This provided two benefits to the project: circulation of the oxidant solution through the soil assured better distribution and contact with the contaminant, and the cost for potable water to prepare the permanganate solution was avoided.

(2.b). Phase II ISCO Treatment Using Sodium Permanganate:

Following the year-long ISCO treatment with potassium permanganate that ended on October 29, 2004, post remediation monitoring of soil and groundwater during April and July 2005 indicated that residual, adsorbed-phase PCE existed, at reduced concentrations, in the previous treatment area. A new work plan was developed with the following goals: 1) treat and reduce concentrated source material in the upper fine sand unit in the previous treatment zone to a total VOC concentration range from 100- to 1,000 μg/kg; 2) maximize removal of adsorbed-phase VOCs from the upper sands in the saturated and unsaturated zones (to approximately 15 ft bls); and 3) prevent rebound of VOCs from soils following treatment.

Shaw Environmental mobilized to the Site on December 4, 2006. The approach to this work was different from the previous ISCO treatment in two ways: sodium permanganate was selected based on greater solubility, and dosing/delivery of the oxidant would be achieved through gravity-fed, slotted PVC laterals in soakage pits rather than pressure delivery through well points. Two soakage pits were planned, one (designated 'south') in the area of the concrete slab and septic drain field previously treated, and a second ('north') soakage pit inside the east end of the existing on-site building. Construction of the north seepage pit required a cutout in the concrete floor slab (see photographs #13 and #15).

The sodium permanganate was received on-site as remediation grade $NaMnO_4$ in a 40 percent by weight solution, then diluted with hydrant water to produce a 3 percent by weight solution. Beginning on December 18, 2006 and continuing into mid-January, 2007, 21,682 gallons of the 3 percent solution were applied through 6 distribution laterals. Flows into each lateral were manually adjusted to maintain a steady flow without backing up or "mounding." At that time, ISCO operation was stopped for several weeks to qualitatively evaluate the distribution and performance of the oxidizer, based on the characteristic purple coloration seen in monitoring wells and piezometers. As with the earlier ISCO treatment, some locations had received ample amounts of permanganate, while others were starved. On February 18, 2007, a final round of oxidizer application began. Distribution was heavily biased toward starved areas, primarily lateral SL-6 in the north seepage pit (now under a new concrete floor in the east end of the building), with the remainder directed to lateral SL-1 at the south end of the south seepage pit. The remaining four laterals were valved off. The final application of sodium permanganate, 3,650 gallons at the same 3 percent solution, ended on February 27, 2007.

Results of the post-injection soil sampling for the Phase II ISCO treatment are discussed in Section VII, Technical Assessment, Question A.

(3). The third remedial component of the Alaric IA ROD is containment of contaminated water in the surficial aquifer and the intermediate semi-confining zone using Groundwater Recovery and Treatment systems (GRATs). The two GRAT systems operate independently, and the surficial recovery system was designed to complement operation of the ISCO system. As such, construction of the GRATs was coincident with construction of the ISCO system during July and August, 2003. Construction activities specific to the GRATs included installation of recovery wells in the IZ, and placement of a deep injection well for return of treated groundwater from the IZ to the Floridan aquifer.

(3.a.1). Surficial Aquifer GRAT:

The surficial aquifer recovery system was designed to complement the operation of the ISCO system. This system provides hydraulic containment of the injected oxidant and any displaced groundwater, and provides the means to promote accelerated groundwater flow and improved in-situ mixing. Three recovery wellpoint trenches were constructed: (1) northeast recovery trench; (2) central recovery trench; and (3) the southwest recovery trench (see Figure 4).

The groundwater recovery wellpoints were installed along two-foot-deep piping trenches. The wellpoints were installed by direct-push, advancing to approximately 12 inches into the clay aquitard (varying from 10 to 15 feet bls). The wellpoints were finished in 24-inch-round traffic-bearing manholes. The wells were screened at two depths: (1) full surficial recovery wellpoints (10-foot screen length); and (2) lower surficial recovery wellpoints (5-foot screen lengths). This variable recovery depth was used to create preferential flow lines in the deeper surficial sands above the clay.

Groundwater is recovered through an eductor system. Each wellpoint wellhead consists of an eductor, drop tube, control ball valve, and pressure gauge. Eductors are an inexpensive means to pump a multitude of wells and have no moving parts to fail. Two circuits of headers and laterals are used to operate the eductors. Motive water flow is provided to the inlet side of the eductor. Discharge water is piped on a separate circuit.

All three recovery wellpoint laterals terminate in a 4-foot square concrete vault, outside the wellpoint "trench." These vaults contain all manifold isolation valves for the motive lines from each lateral/point. Recovered groundwater is conveyed from the manifold vaults to the equipment/treatment building using headers, with the longest run being approximately 230 feet. A main recovery manifold outside of the equipment building connects the groundwater recovery headers to the eductor tank. Likewise, motive water originating from the eductor feed tank system is manifolded back to the recovery wellpoint trench vaults. Four additional vertical recovery wellpoints were added to capture the injected flow from injection point IP-25 at the former overspray area.

(3.a.2). Surficial Aquifer Water Treatment:

Recovered groundwater is captured and re-circulated in the eductor feed tank before being pumped into the treatment train, or being circulated as motive water for further groundwater extraction. Flow rates into and out the motive tank are continuously recorded with flow-indicating transmitters.

In the first treatment step, surficial groundwater is passed through a tray-style air stripper in which volatile contaminants are stripped from the water and released into the air stream. This unit is sized with a 20-percent safety factor and can operate up to 90 gallons per minute.

Liquid effluent from the air stripper is passed through bag filters to remove suspended solids, oxidized iron, or biological solids. Two bag filters are configured in parallel using 50- or 25-micron bags. The duplex arrangement allows bag filters to be changed while the system is in operation and doubles the filtration capacity. A differential pressure transmitter records the losses across the filter and indicates to the system operator, via the control panel, when the bag filter(s) needs to be replaced.

Following air stripping and filtration of solids, the surficial groundwater is treated using granular activated carbon (GAC). The process was sized to use dual 1,500-pound GAC units, and is designed to: (1) remove any residual volatile organic halogens (VOHs) following air stripping, (2) treat any trace-level pesticides and herbicides captured from the HCC dissolved plume, and (3) treat trace metals from the HCC plume.

Exhaust air from the tray stripper is discharged, untreated, to the atmosphere from a 16-foot high stack. Emissions from the tray stripper, calculated using 2007 data, are less than 0.004 ounces/day (see October 2007 Operating Report) of total VOHs, which is well within the FDEP maximum allowable emission limit of 13.7 lb/day for hazardous air pollutants (HAPs) from a remediation site. An exhaust flow meter and influent VOH water concentrations are used to monitor the actual off-gas concentrations.

During the initial ISCO treatment using potassium permanganate, effluent from the surficial aquifer treatment system was almost entirely routed to the permanganate feed system for make-up process water for the injected oxidant. Approximately six gpm of the flow was diverted to two exfiltration galleries, shown in Figure 4. The north exfiltration gallery is located along the northern property line for the Alaric Site. This gallery was designed to form a groundwater divide and help to isolate the Singleton Battery metals plume, located north of Alaric. The southwest exfiltration gallery is located on the western edge of the HCC wooded parcel, located south of the Alaric property. These galleries are oriented to provide the most optimal profile for minimizing the induced groundwater mounding.

The exfiltration gallery is constructed of 4-inch HDPE installed in a non-calcareous rock base to a depth of 5 feet. The exfiltration laterals are placed within two feet of the ground surface. The north and southwest galleries are 500 and 280 feet long, respectively. The gallery construction includes a cleanout and a 2-inch PVC piezometer for water level gauging. The piezometer has a downhole pressure transducer and is remotely monitored by the programmable logic controller (PLC) for the entire surficial groundwater recovery and treatment system.

(3.b.1). Intermediate Semi-Confining Zone GRAT:

Groundwater recovery in the IZ was designed and constructed with four intermediate recovery wells identified as RW-I1 to RW-I4, and located as shown on Figure 8. The locations of the wells were selected with the aid of a two-dimensional groundwater flow model in order to provide adequate hydraulic containment without excessive groundwater withdrawal from the adjacent Helena Site. Variable-speed electric submersible pumps (½ hp) are installed in each of these wells and are capable of pumping from 1.2 to 7 gpm over a wide range of discharge heads. A downhole pressure transducer is used to control the pump operation.

Each recovery well is screened across the base of the upper intermediate zone and into the lower intermediate zone from 40 to 80 ft bls. An outer 12-inch-diameter steel casing was installed within a 16-inch borehole to isolate the surficial aquifer. A 10-inch borehole was drilled within the casing to the final well depth. The wells are constructed of 6-inch-diameter, Schedule 40 PVC with 10 slot (0.01 inch), continuous slot, wire-wound screen with flush thread fittings and TeflonTM o-rings, and a 6-20 mesh filter pack. All wells are finished with bentonite seals, grout, and flush, 24-inch-square pre-cast concrete well vaults with locking diamond steel covers.

The discharge from each well is piped to the east side of the equipment building, where it is manifolded before being stubbed through the building wall for treatment. The discharge line from each well has a totalizing flow meter, check valve, sample port, and globe valve for flow control.

(3.b.2). Treatment of Groundwater from the Intermediate Semi-Confining Zone:

During startup of the GRAT system, groundwater recovered from the IZ was originally treated with a cartridge filter assembly and dual carbon adsorption units prior to discharge to a deep injection well. Initial concentrations of total VOCs measured in the combined flows of recovery wells RW-I1 through RW-I4 (Fig. 5) were higher than originally predicted. Analytical results for the combined influent sample collected on February 23, 2004 showed total VOCs to be 6,235 μg/L, with 4,700 μg/L of the total attributed to PCE. The cause was suspected to be high VOC concentrations being recovered from RW-I4, which is located approximately 50 feet south of the shallow, main source area. On May 5, 2004, a sample collected directly from RW-I4 revealed 12,000 μg/L of PCE, which contributed to a total VOC value of 13,914 μg/L. This indicated that the source of contamination had migrated through the upper clay strata and had significantly impacted the intermediate semi-confining zone. In June 2004, upon review of the May 5 sampling results, operation of RW-I4 was stopped and has not resumed.

An evaluation of treatment costs showed it would be more cost-effective to add an air stripper in-lieu of incurring increased carbon costs for the expected duration of the project. Subsequently, a 3-tray air stripper capable of 25 gpm was added in April 2005 to treat groundwater from the IZ. The air stripper also reduces effluent concentrations of vinyl chloride, iron, total dissolved solids, and manganese that had been elevated in the original system. The liquid effluent from the tray stripper was conveyed to two effluent cartridge filters to remove suspended and dissolved solids down to 10 microns. The cartridge filters are essential to minimizing the passage of fines which could eventually clog the injection well. Three 1,000-pound granular activated carbon (GAC) units follow the cartridge filtration. The GAC units are intended to remove any residual VOCs from the IZ groundwater and also remove low-level pesticides and other contaminants from the HCC property, if present.

Similar to the surficial GRAT system, exhaust gases from the intermediate treatment system are discharged to the atmosphere without treatment. Using 2007 data, the total VOC emissions rate is calculated to be less than 0.001 ounces/day for the intermediate system.

Treated water from the intermediate semi-confining zone is discharged directly into a deep injection well (into the Floridan aquifer), located on the former Alaric property (Figure 6). The injection well is finished as an open borehole in the Ocala limestone from 300 to 440 ft bls. The open-hole construction into the Ocala limestone helps preclude fouling the injection well, as the open area of a borehole in limestone greatly exceeds the open area of an equivalent length of injection screen. A triple-cased well construction was employed to prevent the downward migration of contaminants. The outer 14-inch PVC casing was installed within an 18-inch borehole to isolate the surficial aquifer. A deeper 10-inch casing was installed to 140 ft bls within a 14-inch borehole to isolate the intermediate aquifer from the injection well casing. The four-inch injection well casing terminates at 300 ft bls. Open-hole drilling was continued to 440 feet. Air release valves were installed on the casing and effluent piping to allow automatic venting of trapped air.

Systems Operations and Maintenance (O&M)

Of the 3 remedial components identified in the IA ROD, only the GRAT systems are subject to ongoing O&M. The other remedial components, (1) removal of the septic tank system and the contaminated shallow soils, and (2) in-situ chemical oxidation (ISCO) treatment of deeper contaminated soils, first using potassium permanganate, and later using sodium permanganate, were events that have been discussed under Remedy Implementation.

Per EPA records, the GRAT system for the surficial aquifer was determined to be operational and functional on September 5, 2003, and began operation on September 15, 2003. The GRAT system for the IZ was brought on-line early in 2004. Both the shallow and the intermediate GRAT systems continue to be operated to contain the contaminant plumes and to treat recovered groundwater. Since the start of GRAT operations, one or both of the systems have been off-line at various times and for varying reasons, including: routine maintenance, equipment/system testing and evaluation, equipment failure, equipment reconfiguration, storms, flooding, and power outages. Such interruptions to operation are documented in monthly operating reports prepared for EPA by the O&M contractor. A typical monthly report (see Attachment 6) also summarizes process flows and run times for each GRAT system, addresses status and potential issues, and charts individual VOC contaminant concentrations over time.

During the operational period, both GRAT systems have been reconfigured. The original GRAT system treating groundwater from the intermediate semi-confining zone was particle filtration followed by carbon adsorption. In April 2005, an air stripper was added as the first step, resulting in the treatment sequence of air stripping, particle filtration, and carbon adsorption. After September 2005, the intermediate GRAT system was revised to its current treatment configuration of carbon adsorption, followed by air stripping, and finally particle filtration before the treated water is pumped into the Floridan aquifer via an on-site deep well.

The GRAT system treating groundwater recovered from the surficial aquifer was originally configured with air stripping, followed by particle filtration and carbon adsorption. After October 2005, the shallow GRAT system was reconfigured to its current treatment sequence of particle filtration, carbon adsorption, and finally air stripping before the treated water is returned to the surficial aquifer via two on-site exfiltration galleries (see Figure 4).

Concentrations of the VOC contaminants entering and being discharged from each of the GRAT systems are analyzed monthly. When vinyl chloride was detected in the treated water exiting the intermediate GRAT system, the air stripper was added to assure that the water being discharged to the Floridan aquifer met the discharge standard, i.e., one microgram/liter, the FDEP MCL for vinyl chloride in drinking water. Ultimately, it was determined that the vinyl chloride removal was more effective when the GAC treatment preceded air stripping, and both GRAT systems were revised to that configuration.

The other significant operational change deals with groundwater recovery from the intermediate semi-confining zone. As discussed earlier, operation of the intermediate recovery well RW-I4 was curtailed after system startup because high concentrations of total VOCs were being captured in, and suspected of being drawn into, the IZ. The conclusion was that operation of this RW-I4 could contribute to VOC contamination in the IZ, and the decision was made to terminate further operation of the fourth IZ recovery well.

EPA's Comprehensive Five Year Review Guidance (EPA 540-R-01-007, June 2001) states that widely varying or unexpectedly high O&M costs may be early indicators of remedy problems, and a comparison to O&M costs estimated in the ROD is suggested. In the Interim Action ROD, projected costs were estimated for operation and maintenance of the GRAT system only. The estimates included the cost for groundwater sampling, monitoring, reporting, and the contract award fee. Spread over five years, the average O&M cost was projected to be $212,500 per year (rounded). Reported O&M costs for 2003, and 2005-2007 are shown in Table 2, below. During 2004, the Phase I ISCO treatment and operation of both GRAT systems was in progress, as well as groundwater monitoring and sampling of contaminated soils in the area of permanganate treatment. Total remedial and O&M costs for 2004 have been reported as $1.002 million. An attempt is being made to reconcile the breakout of remedial vs. O&M expenses, but as of March 2008, that information is not yet available. The available data indicates the average operational cost incurred for the groundwater containment systems was $290,696, vs. the projected annual cost of $212,500.

Table 2 : Annual System Operations/O&M Costs

Year	Projected Costs	Actual Costs
2003	$212;542	$187;006
2004	see text	see text
2005	$ 212,542	$350,003
2006	$ 212,542	$219,680
2007	$ 212,542	$406,096
4 Year Total	$850,168	$1,162,785
4 Year Average	$212,542	$290,696

EPA Region 4 has finalized Remedial Action Reports (RARs) for two of the three remedial components selected in the IA ROD. Each of the RARs includes a summary of project costs, which includes both capital construction costs, and O&M costs, where appropriate. Cost tables from each of the RARs have been extracted, and are presented at the end of this report as a continuation of Table 2.

V. Progress Since the Last Review

This is the first Five-Year Review to be conducted following signature of the IA ROD for the Alaric Site in July 2002.

VI. Five Year Review Process

Administrative Components

Major elements of this Five-Year Review included a document review, interviews with regulators and other interested/involved parties who could provide additional information or insight for Site-related issues, and a Site inspection.

Review Team. The following personnel contributed to the Five-Year Review process for the Alaric Site:

Mr. Galo Jackson, P.G., EPA Remedial Project Manager
Ms. Nancy Murchison, FDEP, Project Manager (Tallahassee, FL)
Mr. Frank Zepka, USACE, Jacksonville FL District
Mr. Cal Butler, Project Manager, Shaw Environmental, Inc.
Ms. Karen Singer, Esq., EPA Site Attorney
Ms. L'Tonya Spencer, EPA Community Relations Coordinator
Mr. Chris Strzempka, Geologist, Shaw Environmental, Inc.

Schedule. The review of background documents and Site history began July 2, 2007. The Site inspection and community interviews were conducted on July 18, 2007. Additional site research and preparation of the draft report took place between July 19 and November 15, 2007. From that time until the date of signature and approval, the draft report was subject to review and revision to address or incorporate comments.

Community Notification and Involvement

Historically, the Alaric Site has not generated a great deal of public concern and interest. Public participation in open meetings and comments on documents such as the ROD have been very light.

A public notice, placed in The Tampa Tribune on July 18, 2007, announced that the first Five-Year Review for the Site was being conducted. See Attachment 3. The notice provided contact information for EPA's Remedial Project Manager (RPM) and for EPA's Community Involvement Coordinator (CIC). To date, no one has requested further information, nor requested the opportunity to comment or be interviewed.

The former property owner, now the trustee for the property, was notified that the Five-Year Review was being performed. EPA provided an electronic version of the Tampa Tribune announcement to the trustee's attorney. There were no issues in the Five-Year Review which required information from the trustee, and no communication was initiated on his behalf by the attorney.

The CIC conducted interviews with six people in Orient Park. Copies of the completed Interview Worksheets are included at Attachment 5. Note that, for privacy reasons, the names and addresses of persons who provided responses have been blacked out on the worksheets. In general, most of the respondents were not aware of the Alaric Site and none expressed concerns related to the Site. Some people discussed unpleasant smells in the air (not specific to Alaric); others expressed concern that the battery plant was buying properties and expanding.

One family has communicated regularly with EPA's RPMs regarding health-related matters potentially associated with three Superfund Sites in the immediate area. In this case, a family member is in poor health, suffering from heart and lung problems. The family indicates that they have been on public potable water supply since moving there in 1982, but indicated that other neighbors had shallow wells and may have suffered health problems as a result. The federal Agency for Toxic Substances and Disease Registry (ATSDR) conducted a health consultation in June of 2006. In August 2007, the O&M contractor reported results of air dispersion modeling using multiple variables and inputs. The modeling report (Attachment 7) concluded that for the current groundwater treatment configuration, VOCs released to the atmosphere from the air stripper exhausts resulted in concentrations safely below their respective 10^{-6} cancer risk concentrations. Also, in September 2007, a toxicologist in EPA Region 4's Technical Support Branch reviewed air sampling results from June 2007 and compared those results to established risk-based concentrations. Based on the results of that comparison, the toxicologist concluded that all reported values are below or within the USEPA cancer risk range and below the non-carcinogenic reference concentrations (RfC) or other recommended allowable air concentrations (see Attachment 8).

Local Information Repository. For EPA Superfund Sites, i.e., those hazardous waste sites that have been formally listed on the National Priorities List (NPL), EPA establishes a local Information Repository in or near the community where the Site is located. The purpose for establishing a repository is to provide concerned citizens with convenient access to various documents, including plans, studies and reports such as RI and RODs. These documents form the basis for actions taken at the Site. For the Alaric Area Groundwater Plume Site, the Information Repository has been designated as the 78th Street Community Library, located at 7625 Palm River Rd., Tampa, FL 33619 (813-273-3652).

On the date of the Site visit, the USACE representative visited the Information Repository (IR) and requested to view the materials for the Alaric Site. The staff on hand was not familiar with the requested materials, and after some discussion, located IR records pertaining to other local Superfund Sites. After further discussion and prompting, the staff was able to locate a box with several binders of documents which had been placed there in 2002. It appeared that copies of more recent documents and studies had not been added, and that there was little public interest in viewing them.

Copies of this report are to be placed in the Information Repository and in the official Site file maintained at the EPA Region 4 offices in Atlanta.

Document Review

Documents reviewed in support of this report include:

Date	Author	Title
09/21/1988	NUS Corp.	Final Site Screening Investigation Report, Orient Park/Tampa, FL
12/01/2000	EPA	Notice of Site Listing on the NPL, Published in the Federal Register
7/23/2002	EPA	Interim Action Record of Decision
June 2004	EPA	Final RA Report for Shallow Soil and Septic System Removal
May 2005	EPA	Draft RA Report for Treatment of Subsurface Soil by In-situ Chemical Oxidation
March 2006	EPA	Interim RA Report for Groundwater Contamination at Alaric Site
8/13/2007	Shaw	Optimization Report-Air Dispersion Modeling
8/21/2007	Shaw	Phase II Interim Action Completion Report for Permanganate Injection
Oct 2007	Shaw	Updated Table 2A (from 8/21/07 Phase II IA Report), Summary of Laboratory Analytical Results for Target VOCs in Groundwater (includes Sept 2007 sampling results)

The purpose for reviewing these documents was to understand the history of the Site and to identify any issues or past concerns to be considered in the course of the Five-Year Review process.

Data Review

A substantial amount of monitoring data has been generated in the course of implementing the IRA at the Alaric Site. Table 3 at the end of this report is a compilation of historical and current analytical results for VOCs in groundwater. All monitoring wells associated with the site are sampled at least every two years. Wells along the leading edge of the plume or in close proximity to the ISCO remedial activity are monitored more frequently. As stated in Section III, under the heading Land Use and Resources, only one operating potable water well within 500 yards of the Site was identified by the Public Health Assessment. That well was upgradient of the contaminant plume associated with the Alaric Site, and as such, no potable water wells are sampled in conjunction with the remedy selected by the IA ROD.

The Site contaminants being monitored were identified in Table 7-1 of the IA ROD as Chemicals of Concern: PCE (shown there under the alternate name of tetrachloroethane), TCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, aluminum, iron, manganese, and zinc. The first five chemicals listed are the chlorinated solvent PCE and its degradation products responsible for the dense, non-aqueous phase liquid (DNAPL) plume in the groundwater beneath the Site. The concentrations of these five compounds violate State and/or Federal primary drinking water standards. The remaining four analytes are metals, with State of Florida Secondary Drinking Water Standards (i.e., aesthetic characteristics such as taste, odor, and color), and do not have established State Primary Drinking Water Standards. Initially, all nine contaminants of concern (COCs) were monitored. However, sampling results indicated that the metals were not site-related COCs, and only the chlorinated solvent COCs continue to be monitored today.

Results are presented for groundwater collected from the surficial aquifer, the upper, middle, and lower IZ, and the Upper Floridan aquifer, including baseline results for the deep injection well. Monitoring results are also presented for various points in the process treatment train for both the shallow and intermediate GRAT systems. Table 3 contains the data to support much of the evaluation and conclusions formed in the Five-Year Review Report. Several figures are also available at the end of this report which spatially present groundwater analytical results in the surficial aquifer and in the IZ. The data is analyzed and discussed further in Section VII, Technical Assessment, Question A.

Site Inspection

The Site visit and inspection were conducted on July 18, 2007. Personnel in attendance were Mr. Galo Jackson, the EPA Region 4 RPM for the Site; Ms. Nancy Murchinson, Project Manager for FDEP; Mr. Cal Butler of Shaw Environmental & Infrastructure, Inc.; and Mr. Frank Zepka, USACE Jacksonville District.

The review team first received a Site safety orientation from Mr. Butler, who also provided a general Site orientation and overview of the GRAT equipment room, control room, and remote monitoring/control system. The team reviewed, at length, the history of the Site, the progress made to-date, and its current status. Additional time was spent walking the Site, and observing the general character of the surrounding neighborhood. No significant deficiencies were noted during the Site visit. One monitoring well, located inside the fenced area, was found unlocked. The official Five-Year Review Site Inspection Checklist is included in Attachment 4.

A few questions or considerations were raised during the Site inspection, including:

> Mr. Jackson questioned if FDEP will want to continue containment of the groundwater plume beyond 2008? (The IA ROD calls for the groundwater pump and treatment system, which also provides plume containment, to be operated for a minimum of five years, which began in September 2003.)
>
> Ms. Murchison's concern is that the VOC soil contamination extends to at least 15 ft bls, into the clay layer, and that significant improvement has not been seen at that depth.
>
> 1, 4-dioxane, sometimes used as a stabilizer for PCE, was identified an emerging COC nationwide, and may merit further consideration at the Alaric Site.
>
> The need for institutional controls (ICs) and what might be done was questioned.

Interviews

In February 2007 and on later dates, Frank Zepka of USACE spoke by telephone with EPA's current RPM, Galo Jackson. Mr. Jackson provided background information on the Site and provided names and contact information for regulatory personnel and the remedial contractor that have been involved with the Site. Mr. Jackson provided information on the Administrative Record and the WasteLAN database used by EPA Region 4 to maintain official records for the Superfund Program.

During the Site inspection and on later dates, conversations took place between Mr. Zepka (USACE), Ms. Murchison of FDEP and Mr. Butler of Shaw Environmental. Mr. Butler provided much of the information regarding completed and ongoing remedial actions at the Site, including monitoring and operational data and reports.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the Decision Documents? Each of the three components of the remedy specified in the IA ROD will be discussed separately below.

(1). The first remedial component required by the IA ROD was excavation of the shallow subsurface contamination, the septic tank, and the drain field. The stated purpose of this remedial action was to eliminate soils in the vadose zone contaminated with high levels of VOCs, which provided an ongoing source for groundwater contamination. The stated goal was successfully achieved and no further action (e.g., monitoring or O&M) is required. For this component, the answer is YES.

(2). The second component of the selected remedy is ISCO. As discussed in Section IV, under the subheading Remedy Implementation, ISCO treatment was undertaken on two occasions, first using potassium permanganate, and later using sodium permanganate. In both instances, progress was made in reducing total VOC concentrations in soil. Table 8 at the end of this report presents confirmatory soil sampling results collected in April 2007, following completion of the Phase II ISCO treatment. In several instances, where prior contamination data is available for the same location and depth, percent reduction of total VOCs ranged from 94 percent to as high as 99.9%. However, the results for Soil Boring SB112 indicate that, at a depth of 9.5 ft bls, soil contamination has been reduced by 99.9%, but contamination still exists at 2,062 μg/kg, which is above even the upper end of the 100 to 1,000 μg/kg cleanup target range.

Likewise, at a depth of 6.2 ft in SB109, soil contamination has been reduced 94%, to 33,000 μg/kg. However, just above that point, at 5.0 ft bls, the total VOC concentration was 3,000,000 μg/kg. Results such as this demonstrate the difficulty of uniformly distributing the oxidizing permanganate solution throughout a non-uniform soil media. The IA ROD acknowledged that variable surface geology could influence the effectiveness of remedy, and in response to that, allowed for a range of contamination in which cleanup of the source materials could be terminated. The soil sampling results reflect that where the permanganate adequately contacted the contaminated soils, major reductions in VOC contamination were realized. The results also demonstrate that the target cleanup range of 100 to 1,000 μg/kg has not been entirely attained within the soil mass. Additional rounds of ISCO treatment may be required to fully meet the soil cleanup target range. Other methods to attain this goal are being investigated. Therefore, for the remedial component ISCO, the answer to Question A is NO.

(3). The third component of the remedy addresses groundwater contamination, and provides containment of the contaminated groundwater plume, and groundwater treatment. The GRAT remedial component consists of two independent systems to contain and treat contamination in the surficial aquifer and in the IZ. Each system is discussed separately below.

(3.a). For the surficial aquifer, the positive effects of the pump and treat system can be seen by reviewing the analytical data presented in Table 3. Monitoring well MW009 (see Figures 3 and 4) is about 250 ft southwest of the septic tank drain field and former concrete pad (the central hot spot). In August 2003, prior to the start of remedial treatment, PCE was found in MW009 at a concentration of 18,000 μg/L, and TCE at 3,000 μg/L. The table shows that, on two occasions, water in the well was purple, indicative of a permanganate residual in the water, so a sample was not collected. In April and September 2007, PCE was detected at 27 and 20 µg/L, respectively, and TCE was detected at 22 and 11 µg/L on those dates. The results exceed FDEP's MCL of 3 µg/L for each of these contaminants, but a significant improvement can be seen and the results are trending favorably. The IA ROD did not establish groundwater restoration goals, but it did identify that for discharges to groundwater, treated effluent will need to comply with Federal and State MCLs, as well as the substantive requirements established by the State of Florida for underground injections. Comparison to MCLs, or to FDEP's GCTLs which have the same numerical value as MCLs for the Site's chlorinated COCs, is made to demonstrate that treatment is occurring and to provide a reference value indicative that such water would be acceptable for return/re-injection to the aquifer.

MW055 is located about 50 ft south of MW009, and while never having historically high VOC concentrations, had a minor exceedance in September 2007 with PCE detected at 3.2 µg/L, just above the MCL. Sampling results for other wells more distant than MW009 or off of the axis of the plume have not shown problematic COC levels, so those wells are subject to less frequent monitoring.

Moving in the opposite direction, MW027 is located approximately 100 ft northeast of MW009 along the axis of the plume and closer to the concrete pad. Here, pre-treatment PCE concentrations ranged from 26,000 to 40,000 µg/L. After potassium permanganate residual was observed in this well in May 2004, PCE and TCE concentrations dropped into single digits, but have since rebounded. In September 2007, PCE and TCE were detected at 19 and 60 µg/L, respectively, reflecting a moderate decrease in concentrations compared to the April 2007 readings. What may be more significant is that the degradation products, cis-1,2-DCE and vinyl chloride comprise the dominant mass of total VOCs in this monitoring well. Here, it is clear that the ISCO permanganate treatments, while designed to degrade the PCE soil contamination, have also contributed to the decrease of groundwater contaminant concentrations.

Comparing these two key indicator wells, results for MW009 show minor exceedances for PCE and TCE at less than one order of magnitude above the MCLs and GCTLs. However, the situation appears to be stable and trending favorably. MW027, the closer of the two wells to the source, had a September 2007 PCE concentration comparable to MW009, but other VOC concentrations still raise questions about long-term trends. For the surficial aquifer, the conclusion is that the groundwater plume is being contained, even drawn in, and that the groundwater treatment is effectively reducing VOC contamination. The focus area is moving from the original edge of the plume back toward the source area. Note that, with respect to groundwater, the RAO established in the IA ROD is to collect, treat, and dispose of VOC-contaminated groundwater. As stated in Section 9.2.2., federal and State drinking water standards would be the primary interim criteria used to monitor the effectiveness of the remedy in reducing groundwater contamination. Thus, the comparison of groundwater sampling results to

MCLs is made to assess if contaminant reduction is being realized, but attainment of those regulatory values is not a stated RAO. Appropriate ARARs for groundwater restoration will be established later, when a final ROD is approved.

(3.b.1). In the intermediate semi-confining zone, results presented in Table 3 show very good reductions of PCE contamination in Lower Intermediate Zone (~60-80 ft bls) wells MW018, MW021, and MW022. However, much of the noted improvement took place prior to initiation of the GRAT, so the early improvement may arise from dispersion, or from natural attenuation. It appears that as PCE concentrations have decreased, TCE concentrations spiked higher, then also began to decrease. Since GRAT operation began in the IZ in early 2004, PCE and TCE concentrations in these peripheral wells have continued to trend downward and 2007 sampling results for two of the wells show that PCE concentrations have dropped below the MCL. Note that, although the ISCO treatments were only made to the surficial aquifer, above the clay aquiclude, a July 2005 groundwater sample collected at 70-ft bgs in MW022 was purple, indicating the presence of potassium permanganate.

Beneath the source area at MW068 (64 ft bls), PCE concentrations above 20,000 μg/L were reported in April 2007 (see Figure 6). At that time, an original and a duplicate sample were collected, and the reported values differed by roughly 50 percent for the three contaminants, making any comparison to the July 2005 analytical results questionable. No earlier samples exist for MW068, so it is impossible to state what conditions existed prior to treatment, or if contaminant concentrations are stable or actually increasing. Even though a reduction of contaminants has not been demonstrated near the center of the plume, sampling results from peripheral wells in the Lower IZ indicate contaminant concentrations are declining and that the plume is being drawn in laterally.

(3.b.2). As shown in Table 3, data for the Middle IZ more clearly demonstrates effectiveness of the GRAT. Several peripheral monitoring wells (014, 017, 019, and 020) have data covering 10 years which clearly show consistent decreasing contaminant trends in which PCE has reached acceptable levels (see Figures 7 and 8). In the same monitoring wells, TCE concentrations have spiked and are now trending downward, but still exceed the MCL. The results indicate that PCE is being reduced to TCE and other degradation products, and that the plume is being contained and drawn in laterally. However, data from July 2005 and April 2007 reflect that three wells (MW011, 067, and 069) in or near the source area have increasing concentrations of PCE. The highest observed PCE value in the Middle IZ in 2007 exceeds 75,000 μg/L, at MW069.

(3.b.3). For Upper IZ samples analyzed in July 2005 and April 2007, PCE concentration at MW073 (see Figures 9 and 10), centered within the source area and plume, remain high and relatively unchanged, at or above 80,000 μg/L. In contrast, MW072 (located 10 ft. northwest and within the source area) and MW078 (30 ft. southwest of MW073, outside of the source area) both show PCE concentrations reduced by 80 percent, and total VOCs cut by half, but concentrations of the degradation products TCE and cis-1,2-DCE have increased dramatically since 2005. Recall that the IZ is not a true aquifer, and that the Upper IZ is so hydrologically constrained that a flow direction cannot be determined. As such, a statement cannot be made that the GRAT is confining a plume of contamination within the Upper IZ.

Further support for the effectiveness of the GRAT systems can be found in the monthly Operating Reports (see Attachment 6) prepared by the O&M contractor. For the shallow and intermediate systems, monthly data summarizes hours of operation and gallons of groundwater recovered in each system. Based on monthly influent and process sampling results, the mass of VOCs recovered and the air emissions rate are calculated (EPA also conducts semi-annual stack emissions testing). For the most recent month, the mass of total VOCs recovered was calculated as 0.23 lbs in the shallow GRAT and 7.9 lbs from the intermediate system.

Attachment D of the Operating Report also charts influent concentrations of COCs recovered since the start of pump and treat operations. The concentrations are average values which represent influent mixed from multiple recovery points, and thus present a good indicator of changes in the aquifer as a whole. In both systems, concentrations of the parent contaminant, PCE, have declined drastically. Daughter compounds or degradation products of PCE have increased in concentration, which is a favorable indicator. In particular, vinyl chloride experienced significant spikes, and then returned to moderate levels approaching the MCL.

In addition to the reduction of contaminant concentrations discussed for peripheral monitoring wells, the statement that contaminants are being contained is supported by potentiometric maps prepared for the Site. For this type of map, groundwater elevations are recorded almost simultaneously, and then plotted on a map to show iso-elevation lines, representing a pattern of groundwater elevations. Figure 11 is a potentiometric map of the Lower IZ based on groundwater measurements taken in April 2004 when only two of the four intermediate recovery wells were being operated. Since groundwater flows from higher to lower elevations, the map is interpreted to mean that contaminated water is being pulled toward the pumps and recovered for treatment. The operation of the recovery well pumps is variable, but this potentiometric map shows that, in April 2004, the two wells created a capture zone extending beyond the east side of the HCC building and a zone of influence extending more than 700-ft to the southwest.

As discussed above, data does support a conclusion that COC concentrations are being reduced in the surficial aquifer and at all three levels of the IZ. From a long-term systems view, graphs presented in the monthly Operations Report support a conclusion that the GRAT system is successfully reducing COC concentrations in the surficial aquifer. Reduced contaminant concentrations in peripheral wells and potentiometric maps also support a conclusion that the GRAT systems are successfully containing the contaminant plume, as prescribed by the IA ROD. With respect to groundwater treatment, the answer to Question A is YES.

Institutional Controls (ICs) were not specified as part of the remedy in the IA ROD. Section 9.1.2 of the IA ROD does cite that requirements established and enforced by the Southwest Florida Water Management District regarding the installation of new wells serve as ICs to protect public health and ensure the integrity of the groundwater remedy. Since contaminated soils do not exist at the surface, they do not pose a risk of current human exposure. However that situation could change if extensive excavation was a part of new construction. EPA signed an agreement with the trust which currently owns the property, as well as the trustee of the trust, and former owner, who are required to implement any institutional controls determined to be necessary.

Based on the discussion regarding ISCO treatment, and the fact that the Soil Cleanup Target Level range of 100 to 1,000 μg/kg has not been attained at several locations, the overall answer to Question A is **NO.**

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?
As part of the Five-Year Review process, it is necessary to evaluate the effect of newly promulgated or modified standards on the protectiveness of the remedy. Newly promulgated or modified standards must be evaluated in order to determine if the cleanup level established in the ROD is still protective.

The Applicable or Relevant and Appropriate Requirements (ARARs) for the Alaric Site have been extracted from Table 12-1 of the IA ROD and are presented below.

In this Five-Year Review, ARARs listed in the IA ROD were reviewed and compared to existing standards to see if any changes in the standards have occurred since the signing of the IA ROD. The results of the comparison and discussion of any changes follow.

According to the ARAR table from the IA ROD, for the remedial component groundwater containment, the chemical specific ARARs require treated water to be compared to the FDEP's Surface Water Quality Criteria for Class III, Predominantly Marine Waters. With respect to groundwater, the chosen remedy is extraction, treatment, and disposal. Water is pumped from the surficial aquifer, treated, and then infiltrated back in to the surficial aquifer. Water pumped from the IZ is treated, and then discharged by deep-well injection into the Floridan aquifer. Since treated water is not being discharged to a surface water body or a treatment plant, the ARAR that requires comparison of treated water to the Class III surface water criteria is no longer applicable. Treated water should be, and in fact is, being compared to the FDEP GCTL criteria as defined in F.A.C. Chapter 62-777. This change is reflected in Table 4, below.

Table 3 at the end of this report contains the GCTLs for the Site's COCs. For the chlorinated COCs in question, the GCTLs are numerically equivalent to FDEP's MCLs

Selected Remedy ARARs
Alaric, Inc. Site, Tampa, Florida

Selected Remedy Component	Major Components	ARARs
Source Remediation	1. Injection of oxidizer via wells and/or direct injection to subsurface 2. Groundwater monitoring	<u>Action Specific</u> • Federal and state requirements for injection of treatment chemicals to groundwater (40 CFR 146 and FAC 62-528)
Groundwater Containment	• Groundwater extraction • Groundwater treatment via air stripping • Groundwater treatment via carbon adsorption (as needed) • Disposal of treated effluent at POTW or groundwater injection • Groundwater monitoring	<u>Action Specific</u> • Federal and State requirements for Injection of treated groundwater back to aquifer (40 CFR 146 and FAC 62-528) • Federal requirements for treatment of extracted groundwater and discharge to groundwater (40 CFR 264.1(g)(6), 40 CFR 261.10, 40 CFR 270.1(c)(2)) <u>Chemical Specific</u> • State Surface Water Quality Criteria for the discharge to Class III Predominantly Marine Waters (FAC 62-302.530) • Federal criteria for discharge of treated effluent to surface water (40 CFR Part 131)
Septic System Removal/Stabilization	• Removal, cleaning, filling and replacement of tank and drain lines as needed.	<u>Action Specific</u> • Federal and State requirements for stockpiling of excavated contaminated soils, debris, and waste (40 CFR 264 and FAC 62-730)

for drinking water. The GCTLs/MCLs have not changed since the signing of the IA ROD. However, the MCL for vinyl chloride is 1 μg/L since FDEP's MCL is more stringent than EPA's standard for this contaminant. Table 3 also lists the corresponding results for treated water being returned to the aquifers. On page 10 the table, results for treated water being returned to the surficial aquifer are presented as Air Stripper 1 Effluent, and on page 12, water from the IZ that will be injected into the Floridan aquifer is reported as Air Stripper 2 Effluent.

Table 5 reflects that there were no changes to action-specific ARARs since the signing of the IA ROD. Table 6 indicates that no location-specific requirements were identified in the IA ROD.

Table 4: Changes in Chemical-Specific Standards

Contaminant	Media	Standard		Citation
VOCs	Groundwater	Previous	FDEP Surface Water Quality Criteria for Class III Water Bodies	FAC 62-302.530
		New	FDEP GCTLs	FAC 62-777

Table 5: Changes in Action-Specific Requirements

ARAR listed in 2002 IA ROD	Environmental Laws and Regulations	Application	Comments	Changes to the ARAR that require new action?
	No Changes to Action-Specific ARARs			

Table 6: Changes in Location-Specific Requirements

Location	Requirement	Prerequisite	Citation/Year
	No Location-Specific ARARs were identified in the IA ROD		

In summary, no ARARs have changed nor have other standards been promulgated since the signing of the IA ROD for the Alaric Site that would affect the degree of protectiveness of the current remedy.

In November 2002, EPA published OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). The intent of the draft guidance is to provide a screening tool to evaluate whether or not vapor from contaminated groundwater may be migrating through soil and entering into occupied buildings, thereby completing an exposure pathway.

Soil Vapor Intrusion (SVI) has become a significant issue for environmental regulators and concerned citizens. The draft guidance has generated a great deal of discussion but it has not been universally accepted, as it is considered by some to be incomplete and controversial.

The draft SVI guidance presents a phased, three tier approach: Tier 1, Primary Screening; Tier 2, Secondary Screening, and Tier 3, Site-Specific Pathway Assessment. The Tier 1 screening asks three questions: (1) Are chemicals of sufficient volatility and toxicity known or reasonably suspected to be present in the subsurface soils or uppermost portions of the groundwater? For the Alaric Site, the answer is YES. (2) Are currently inhabited buildings located near the subsurface contaminants? The answer is YES. However, paragraph I.D. of the guidance also states that the suggested approaches are primarily designed to ensure protection of the public in residential settings but may be adjusted for other land uses (e.g., commercial/industrial, recreational). (3) Does evidence suggest immediate action may be warranted to mitigate current risks? The answer is NO. Affirmative support for question (3) would come from reports of chemical odors or of physiological effects such as dizziness or nausea by building occupants. During the community involvement interviews, one respondent indicated that "There are lots of smells in the air. Not every day, but (it) hasn't been there". It is not known whether the source of the reported smells was the

Alaric Site, other nearby Superfund sites (HCC or Stauffer Chemical Co.) from a nearby smelter, or other commercial/industrial activity. However, there have been no reports of chemical odors or physiological effects from occupants of the on-site building (SCA), nor from contractor personnel who are routinely on-site performing O&M activities. Other factors to be considered as part of question (3), i.e., wet basements, and explosive or acutely toxic concentrations of vapors, are also negative or not applicable. At this point in the SVI evaluation, the draft guidance recommends proceeding to question (4), which begins the Tier 2 Secondary Screening process. Completion of the Tier 2 screening requires additional site-specific information such as the concentration of VOC gases in the near-surface soils.

The chemical 1, 4 dioxane has been identified as an emerging contaminant of concern. One of dioxane's uses is as a stabilizer in PCE, which increases the likelihood that it might be found on the Alaric Site. During April 2007, three samples from the monitoring wells showing the greatest PCE concentrations in the IZ were tested for 1,4-dioxane. The results, all flagged as estimated values, were reported as 5.1, 11, and 6.6 μg/L compared to the FDEP GCTL of 3.2 μg/L. Since the estimated results exceed the GCTL by less than one order of magnitude, the identification of dioxane at the Site should not create alarm, but personnel who manage and monitor the Site should be aware of it as additional risk information becomes available about this emerging COC.

As noted during the community interviews, changes in local land use are occurring. The gradual trend is conversion of residential properties to commercial or industrial use. In terms of possible exposure scenarios and human health risk, the land use changes described above are favorable.

The toxicity data, cleanup levels, and RAOs which were the basis for the remedy selected in the IA ROD remain valid. However, based on the above discussion, SVI may pose a new exposure pathway which should be evaluated further.

Accordingly, the answer to question B is **NO.**

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

EPA's Comprehensive Five-Year Review Guidance indicates that items to be considered for Question C include newly identified ecological risks and impacts from natural disasters.

During 2004 and 2005, the peninsula of Florida was struck or brushed by several hurricanes which caused localized flooding and extended power outages. In turn, those conditions caused Alaric Site operations to be suspended until electrical service could be restored, and mechanical and electrical systems could be verified secure and operational. The major impact to the Alaric Site was the time delays to operational continuity. No major repair costs were incurred because of the storms, and no contaminant migration was identified.

None of the remedial components specified in the IA ROD were directed to ecological risks, and no new ecological receptors or risks have been identified since the signing of the IA ROD.

In summary, no new information has come to light that would call into question the protectiveness of the remedy.

The answer to Question C is **NO.**

VIII. Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
At several locations, ISCO treatment has not attained the target cleanup range of 1,000 to 100 μg/kg.	No	Yes
1,4-Dioxane as an emerging contaminant of concern	No	Yes
SVI Risk	No	Yes
Direct exposure to contaminated soil during excavation/new construction or to groundwater	No	Yes
Monitoring well not locked	No	Yes
Availability of Site information to the general public	No	No

IX. Recommendations and Follow-up Actions

Based on the findings of the Five-Year Review, recommendations and follow-up actions for the Alaric Site have been identified. These are discussed below and summarized in Table 7 at the end of this section.

(1). At several locations, the ISCO treatment has not attained the total VOC soil target cleanup range of 1,000 to 100 μg/kg. This SCTL is not itself protective of human health or the environment. Rather, the range is believed to represent a level at which further loading of VOC contaminants to groundwater could be managed by the GRAT system alone, thus it potentially affects future protectiveness for the groundwater supply. The IA ROD states that when multiple injections of oxidizing agents produce negligible additional benefit, EPA will consult with FDEP regarding whether or not to terminate treatment above 100 μg/kg. The IA ROD also established that the groundwater remedy would operate for a period of at least 5 years, and anticipated that there would be sufficient information available at that time to assess progress and direction forward.

The operational period for the GRAT system will reach 5 years on September 15, 2008. It is recommended that EPA, FDEP, and the remedial contractor review all available data and assess the likelihood that the known remaining hotspots can be successfully treated with another round of ISCO treatment within the 5 year period.

In the event that another round of ISCO treatment is not pursued, or if it is attempted but is not fully successful, it is further recommended that other remedial actions should be evaluated, including source excavation into the top of the confining clay layer. The other soil remediation alternatives evaluated in the IA ROD were in-situ volatilization of the VOC contaminants by high voltage electro-resistive heating, or by steam injection; in both cases, the VOC vapors would be captured and collected for further processing. To a large extent, the degree of successful treatment for these methods depends on the ability to generate or deliver sufficient heat uniformly to the target areas, much the same as the ISCO treatment has been limited by its ability to deliver potassium- or sodium-permanganate uniformly.

One source remedy that was not evaluated in the IA ROD was excavation. It is true that the selected alternative and the others considered provide treatment of contamination, which meets the expectation established in the National Contingency Plan (NCP) that wherever practicable, EPA will use treatment to address principal Site threats (40 CFR 300.430(a)(1)(iii)(A)). The proximity of the existing Alaric building to the source area has been a consideration during the previous limited excavations, and that issue is now compounded by the GRAT equipment building addition immediately adjacent to the source area. A successful excavation of all source material would require excavation into the upper 1-foot of the confining clay layer, typically 10-15 ft., bls. In turn, such an excavation would require extensive stabilization or relocation of the structures. The preference for treatment, and the need to stabilize the existing structure should be weighed against cost and the likely success of excavation if the source problem cannot be resolved by another round of ISCO treatment.

(2). 1,4-Dioxane is an emerging contaminant of concern. A few samples have been collected in IZ wells from locations having historically high VOC concentrations; the results indicate minor exceedances of the GCTL for 1,4-dioxane based on estimated (J-flagged) values. Based on the low estimated results, it is unlikely that 1,4-dioxane would be found in the Floridan aquifer at concentrations exceeding the GCTL (no MCL has been established), so current protectiveness is not affected. However, 1,4-dioxane is known to be more mobile in groundwater than chlorinated DNAPL contaminants, so higher concentrations of 1,4-dioxane may be found away from the plume. Future protectiveness could be affected if concentrations increase, if a MCL is developed for 1,4-dioxane, or if it is found in the Floridan aquifer. USACE recommends additional monitoring in the IZ, and in the Floridan aquifer.

(3). Risk arising from exposure to VOCs from a soil vapor pathway has been considered using Tier 1 Primary Screening from EPA's draft SVI guidance. The Tier 1 qualitative screening indicates that the potential exists for completion of a human exposure pathway. USACE recommends that EPA complete the Tier 2 Secondary Screening using Site-specific information and run the Johnson and Ettinger Vapor Intrusion Model, if appropriate.

(4). Direct exposure to highly contaminated soils during excavation or new on-site construction may affect future protectiveness at the Site. EPA currently has an Agreement with the Alaric Site's property owner/trustee that requires EPA be notified 60 days in advance of any sale or transfer of the property. The Agreement requires them to implement any institutional controls determined to be necessary. The IA ROD did not require the establishment of ICs as part of the remedy. However, until a permanent ROD is developed and signed, options to restrict land use should be evaluated. Likewise, options for covenants to restrict use of groundwater for irrigation or other non-potable uses on all properties where Site contamination exceeds Federal or State MCLs should be evaluated. USACE recommends that EPA work with FDEP to develop and execute an IC Implementation Plan which outlines appropriate action(s) to place restrictive covenants or other ICs on the Site which would be binding on future property owners.

(5). As noted on the Site Inspection Checklist, one monitoring well was found unlocked. Locking reduces the opportunity for the well to be used for unauthorized waste disposal or other acts of vandalism which would further contaminate the groundwater. USACE recommends that all monitoring wells be securely locked at all times unless sampling operations are in progress.

(6). Site information required to be in the local Information Repository was not readily available, nor current. Protectiveness is not affected. USACE recommends that EPA update the records and work with the library to increase the staff's understanding of the Information Repository. Consideration should be given to making more documents available electronically, either on compact disk, or on-line. The current hard copy files should be annotated to clearly direct the public to the additional resources.

Table 7: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
					Current	Future
At several locations, ISCO treatment has not attained the target cleanup range of 1,000 to 100 μg/kg.	(1). Consult with FDEP and remediation contractor; review data. (2). Treat again, or consider other alternatives, including expanded Site excavation.	EPA	FDEP	(1). Jul 1, 2008 (2). Dec 1, 2008	No	Yes
1,4-Dioxane is an emerging COC	Additional monitoring in IZ, and in Floridan aquifer	EPA	FDEP	Sep 30, 2008	No	Yes
SVI Risk	(1). Conduct Tier 2 Screening. (2). Run J&E Model, if appropriate.	EPA	EPA/FDEP	(1). Oct 30, 2008 (2). Apr 30, 2009	No	Yes
Direct Exposure Hazards in Excavation/New Construction or Groundwater Use	Evaluate need and methods for ICs, develop implementation plan.	EPA/FDEP	EPA/FDEP	Sep 30, 2009	No	Yes
Monitoring Well Not Locked	Keep all wells locked unless monitoring activities are in progress.	O&M Contractor	EPA	May 30, 2008	No	Yes
Availability of Site information	Verify that Site information is properly maintained and accessible in the information repository.	EPA	N/A	Jun 30, 2008	No	No

X. Protectiveness Statements

Protection of Human Health

Short-Term

The remedy at the Alaric Area Groundwater Plume Site currently protects human health and the environment because human exposures are not occurring. The inhalation pathway for VOC contaminants released as exhaust stack gases from the groundwater recovery and treatment system has been evaluated, and has been determined not to pose a human health problem. In addition, possible consumption of contaminated groundwater has been addressed through a potable well survey conducted in 1986. The survey found that all users in the affected area were connected to a safe, public water supply system. The nearest surface water body is the Tampa Bypass Canal, which is located about 2,000 ft. to the east and about one mile to the southwest. Sampling results from the ongoing groundwater monitoring program indicate that, for the unconfined surficial aquifer and the intermediate semi-confining zone, the contaminant plumes extends less than 500 feet from the Site's source area. Site-related contaminants have not been detected above MCLs in the Floridan aquifer since August 2000.

Long-Term

The IA ROD is not intended to provide long-term human health protection. Rather, the intent of the IA ROD is to contain groundwater contamination and reduce contamination concentrations in subsurface soil, setting favorable conditions for a permanent remedy to be effectively implemented. A final ROD will establish final clean-up goals, thereby assuring future, long-term protectiveness of human health. However, in the interim, institutional controls, designed to prevent direct exposure of humans to contaminated soil resulting from new excavation/construction, as well as to prohibit the consumption of contaminated groundwater should be evaluated and implemented, as appropriate.

Protection of the Environment

Short-Term

The IA ROD does not establish a specific remedy with respect to protection of the environment. However, by containing the contaminant plume, the possibility of groundwater being released to rivers, lakes, or springs, where ecological exposures could occur, is minimized.

Long-Term

As with human health, the IA ROD is not intended to provide long-term protection of the environment. Rather, the intent of the IA ROD is to contain groundwater contamination and reduce contamination concentrations in subsurface soil, thus setting favorable conditions for a permanent remedy to be effectively implemented. A final ROD will establish final cleanup goals, and thereby assure future long-term protectiveness of the environment.

XI. Next Review

As established in Section 121 of CERCLA, as amended by SARA and the NCP, periodic reviews are required at least every five years for sites where hazardous substances, pollutants or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following the completion of all remedial actions. Barring a change in the governing laws, another review should be completed within 5 years from the signature date of this document.

TABLES

Table 2-a: SUMMARY OF PROJECT COSTS
Shallow Soil and Septic System Removal

The table below provides a summary of the costs for each major cost element and a comparison of the actual and projected costs.

Cost Item	ROD Estimate (2002 Dollars)	RD Budget (2003 Dollars)	Actual Cost (2003 Dollars)
Site Reconnaissance	0	$3,668	$5,134
Soil Sampling	0	$34,171	$45,315
Mobilization	0	$10,644	$1,246
Work Plans	0	$10,492	$17,835
Site Excavation	0	$3,975	$6,254
Backfill, Grade, Seed	0	$8,273	$6,016
Septic Tank System	$25,000	$12,230	$23,850
Transportation/Disposal	0	$37,850	$28,395
Demobe/Site Close-out	0	$2,864	$0
Total RA Costs	$25,000	$124,167	$134,045
Difference between total project costs and total ROD cost estimate.	$109,045 or 500% increase		

1 - ROD included a lump sum estimate for the removal and replacement of the septic tank system

Source: Final Remedial Action Report for the Shallow Soil and Septic System Removal, Alaric Area Groundwater Plume Site (EPA, June 2004).

Table 2-b: SUMMARY OF PROJECT COSTS
Treatment of Subsurface Soil by In-situ Chemical Oxidation

Cost Item	ROD Estimate (2002 Dollars)	Actual Cost (2003 Dollars)
Preliminary Design	26,447	17,228
Treatability Testing/Field Tests	2,382	18,894
Health & Safety Plan	3,769	0
Permits	4,256	19,235
Final Design & Specifications	45,853	31,488
Procurement	6,165	28,049
Mobilization/Set-Up	83,157	174,475
Chemical Costs	461,446	426,010
Performance Mon. Well Installation	19,208	41,754
Pre-Characterization Sampling	11,159	17,609
Field Deployment	204,332	484,904
Phase I Injection Monitoring	8,712	-
Field Deployment (Phase II)	38,987	-
Phase II Injection Monitoring	9,191	-
Process monitoring	1,379	-
Post Deployment Monitoring & Report	37,342	-
Demobilization	12,193	8,730
Final Technical Report	30,567	32,771
Shallow GW Recovery System	-	130,760
GW Transportation & Disposal	-	19,052
Subtotal	1,006,545	1,450,959
Contingency (10%)	100,655	n/a
Total RA Cost	$1,107,200	$1,450,959
Difference between total project costs and total ROD cost estimate.	+ $352,759 or + 32 %	

Source: Draft Remedial Action Report for the Treatment of Subsurface Soil by In-Situ Chemical Oxidation (EPA, May 2005).

Table 2-c: SUMMARY OF PROJECT COSTS
Groundwater Containment

The table below provides a summary of the costs for each major cost element and a comparison of the actual and projected costs.

Cost Item	ROD Estimate (2002 Dollars)	Actual Cost (2003 Dollars)
RA Capital Costs	443,200	842,500
RA Operational Cost	212,500	187,006
Total RA Cost	655,700	1,055,042
Projected O & M Cost	850,167	1,172,994
Difference between total project costs and total ROD cost estimate.	$ 399,342 or 61% increase	

Source: Interim Remedial Action Report for Groundwater Containment at the Alaric Area Groundwater Plume Site (EPA, March 2006).

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW001	05/14/97	16.0	15.0	9	4	140	7		ND		160
	04/18/00	13.0		2	13	50	7		10		82
	08/27/00	13.0		ND	6	39	5		2		52
	11/18/02	13.4		ND	4	11	2	1	ND	1	19
	08/06/03	16.0		ND	2	8	3		ND	ND	13
	04/26/04	16.0		ND	1	2	1		ND	ND	4
MW002	05/14/97	14.0	12.0	6	200	95	10		ND		311
	04/18/00	12.0		2	43	93	4		10		152
	08/27/00	12.0		8	44	45	10		2		109
	11/13/02	12.2		31	46	27	1	2	ND	3	110
	08/08/03	12.9		25	28	6	0.3		ND	7	66
	04/27/04	12.9		PURPLE - NOT SAMPLED							
	07/28/04	12.9		0.6 i	1	28	ND		ND	ND	30
	07/18/05	12.2		0.6 j	5	26	0.5 j	ND	ND	1 j	33
MW003	05/15/97	16.0	12.5	2,430	1,620	ND	ND		ND		4,050
	04/12/00	11.5		370	480	28	1		ND		879
	08/28/00	11.5		42	80	7	ND		ND		129
	11/14/02	14.5		179	64	3	ND	ND	ND	ND	246
	08/06/03	12.9		6,400	3,300	74	2		ND	0.3	9,776
	05/04/04	12.9		11,000	10,000	350	8		0.9	215	21,574
	07/13/05	12.9		19	230	280	1.7 j	ND (5)	ND (5)	1.3 j	532
	04/03/07	12.5		7.1	160	27	0.8 j	ND (2)	ND (2)		195
	04/03/07	18.0		3.1	50	8	0.3 j	ND	ND		61
MW004	05/15/97	16.0	16.0	31	240	62	5		ND		338
	04/12/00	14.0		250	1,900	360	31		ND		2,541
	08/29/00	14.0		280	630	110	9		ND		1,029
	11/12/02	14.4		1,200	777	197	5	2	ND	5	2,186
	08/07/03	14.4		560	2,800	60	3		ND	1	3,424
	08/07/03 DUP	14.4		490	2,800	63	3		ND	4	3,360
	04/28/04	14.5		50	390	170	16		0.7	ND	627
	07/14/05	14.4		2	6	3	ND	ND	ND	ND	11
	04/02/07	15.0		ND	ND	63	1	ND	56		120
MW005	05/14/97	11.0		ND	ND	ND	ND		ND		ND
	04/18/00	12.5		3	ND	ND	ND		10		13
	08/27/00	12.5		ND	ND	ND	ND		ND		ND
	02/26/03	7.2		1	1	ND	ND	ND	ND	ND	2
	08/06/03	12.5		0.4	ND	ND	ND		ND	0.5	1
	04/27/04	12.5		24	6	2	ND		ND	ND	32
	07/11/05	12.5		4	2	2	ND	ND	ND	ND	8
	09/05/07	12.5		0.3 i	0.6 i	4	ND	ND	ND		5
MW006	05/14/97	8.0	9.5	ND	ND	ND	ND		ND		ND
	04/17/00	7.5		ND	ND	ND	ND		10		10
	08/24/00	7.5		ND	ND	ND	ND		ND		ND
	08/06/03	9.5		ND	ND	ND	ND		ND	ND	ND
	04/27/04	9.5		18,000	4,300	11,000	92		ND	ND	33,392
	07/13/05	7.5		1.4 j	0.7 j	100	1.6 j	ND	5	ND	107
	04/02/07	9.5		ND	0.6	1	ND	ND	0.4 j		2
MW007	05/15/97	7.8	11.5	ND	ND	ND	ND		1		1
	04/12/00	6.0		ND	ND	ND	ND		ND		ND
	08/28/00	6.0		ND	ND	ND	ND		ND		ND
	08/06/03	6.0		ND	1	1	ND		ND	ND	3
	05/04/04	6.0		1	10	18	6		ND	ND	34

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW009	05/14/97	14.0		8,700	735	ND	ND		ND		9,435
	04/19/00	13.0		1,500	280	66	3		ND		1,849
	08/27/00	13.0		3,400	700	450	ND		ND		4,550
	11/18/02	13.2		37,800	11,800	3,160	ND	ND	ND	ND	52,760
	08/06/03	15.2		18,000	3,000	780	29		ND	ND	21,809
	05/05/04	15.2		PURPLE - NOT SAMPLED							
	07/29/04	13.2		0.3 i	ND	ND	ND		ND		ND
	07/15/05	15.2		PURPLE - NOT SAMPLED							
	04/04/07	15.0		27	22	48	1	ND	0.7		98
	09/05/07	15.2		20	11	22	0.5 i	ND	0.3 i		54
MW013	09/16/97	15.0		ND	ND	ND	ND		ND		ND
	04/14/00	12.0		ND	ND	ND	ND		ND		ND
	08/28/00	12.0		12	ND	ND	ND		ND		12
	08/06/03	12.0		ND	ND	ND	ND		ND	ND	ND
	04/28/04	12.0		ND	ND	ND	ND		ND	ND	ND
	07/11/05	12.1		0.7 j	0.4 j	13	0.5 j	ND	ND	0.1 j	15
MW015	09/16/97	15.0	12.0	5	6	4	ND		ND		15
	04/11/00	12.0		14	6	2	ND		10		32
	08/24/00	12.0		26	10	7	ND		ND		43
	02/26/03	10.0		226	779	80	ND	ND	ND	ND	1,085
	02/26/03 DUP	10.0		227	904	85	6	ND	ND	ND	1,222
	08/07/03	14.2		430	460	88	3		0.4	8	989
	04/26/04	14.2		25	29	3	ND		ND	ND	57
	07/11/05	12.2		5	3	0.3 j	ND	ND	ND	ND	8
MW016	09/16/97	15.0		ND	ND	ND	ND		ND		ND
	04/11/00	13.0		ND	ND	ND	ND		ND		ND
	08/25/00	13.0		ND	ND	ND	ND		ND		ND
	02/26/03	10.0		ND	ND	ND	ND	ND	ND	ND	ND
	08/05/03	13.0		ND	ND	ND	ND		ND	ND	ND
	04/29/04	13.0		ND	ND	ND	ND		ND	ND	ND
	07/12/05	13.0		ND	ND	ND	ND	ND	ND	ND	ND
	09/05/07	12.2		0.3 i	ND	ND	ND	ND	ND		0
MW027	09/01/00	13.0	11.5	40,000	13,000	2,900	ND		ND		55,900
	11/13/02	12.9		26,500	1,390	221	ND	ND	ND	ND	28,111
	08/11/03	12.9		32,000	2,800	420	9		ND	ND	35,229
	05/04/04	12.9		PURPLE - NOT SAMPLED							
	07/28/04	12.9		4	ND	ND	ND		ND	ND	4
	07/28/04 DUP	12.9		10	0.7 i	3	ND		ND	ND	13
	07/18/05	12.9		2	4	110	1.3 j	ND	ND	ND	117
	04/03/07	12.9		17	72	200 j	3	ND (1)	91		383
	04/04/07 DUP	12.9		31	87	160	3	0.8	100		382
	09/05/07	12.9		19	60	120	2	1.4	58		261
MW028	09/01/00	11.8	12.4	100	19	ND	ND		ND		119
	11/13/02	11.8		17,800	3,860	152	6	1	2	ND	21,821
				Not accessible as of August 2003 because of overlying Carus trailer.							
	07/18/05	12.3		330	150	3,600	30 j	ND (50)	310	ND (50)	4,420
MW28R			12.4	MW028 replaced in April 2007 because of collapsed screen and infilled fmn sand.							
	05/09/07	10.0		14,000	1,500	2,300	36		220	ND	18,056
MW029	11/13/02	11.6	10.7	6	5	1	ND	ND	ND	1	13
	08/06/03	12.9		110	66	18	0.4		0.4	5	200
	04/28/04	12.9		5	3	39	1		0.4	2	50
	07/12/05	12.9		ND	0.2 j	3	ND	ND	ND	1 j	4
	07/12/05 DUP	12.9		ND	0.3 j	3	ND	ND	ND	2 j	5

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW030	09/01/00	13.0	14.7	ND	ND	ND	ND		ND		ND
	11/15/02	13.5		ND	3	3	ND	ND	ND	ND	6
MW031	11/22/02	13.0	13.0	39,700	3,810	464	ND	ND	ND	ND	43,974
	08/07/03	5.8		7,600	750	85	4		ND	ND	8,439
	08/07/03	12.8		7,800	780	91	3		ND	ND	8,674
	04/28/04	12.8		PURPLE - NOT SAMPLED							
	07/29/04	12.8		ND	ND	ND	ND	ND	ND	ND	ND
	07/15/05	12.8		PURPLE - NOT SAMPLED							
	04/04/07	12.8		7.9	5.9	45	2	ND	0.7		62
MW033	12/15/02	11.0		ND	ND	ND	ND	ND	ND	ND	ND
MW035	12/17/02	9.0	13.0	ND	ND	ND	ND	ND	ND	ND	ND
	08/04/03	9.0		ND	ND	ND	ND		ND	1	1
MW040	03/27/03	10.5		ND	ND	ND	ND	ND	ND	ND	ND
	08/05/03	10.5		ND	ND	ND	ND		ND	ND	ND
	08/05/03 DUP	10.5		ND	ND	ND	ND		ND	ND	ND
	04/29/04	10.5		ND	ND	ND	ND		ND	ND	ND
MW041	03/27/03	16.0		456	804	252	ND		ND		1,512
	08/07/03	16.0		350	510	200	2		0.4	11	1,073
	08/07/03 DUP	16.0		340	510	200	2		0.4	13	1,065
	04/28/04	16.0		240	440	170	2		0.4	5	857
	04/28/04 DUP	16.0		210	450	170	2		0.4	5	837
	07/14/05	16.0		74	140	62	0.9 j	1.7 j	ND	1 j	280
	04/02/07	16.0		53	160	73 j	1.3 j	1.8 j	ND (2)		289
MW042	03/27/03	13.5		1	5	26	1		ND		33
	08/06/03	10.8		1	3	22	1		ND	ND	27
	07/11/05	13.2		ND	0.6 j	2	ND	ND	ND	0.1 j	3
MW043	08/13/03	4.3	11.2	39,000	340	830	ND		ND	ND	40,170
	08/13/03	10.8		36,000	330	790	ND		ND	ND	37,120
	04/26/04	4.3		PURPLE - NOT SAMPLED							
	04/26/04	10.8		PURPLE - NOT SAMPLED							
	07/28/04	4.3		680	780	2,200	130		18	ND	3,808
	07/28/04	10.8		490	960	2,300	97		15	ND	3,862
	07/18/05	10.8		490	49	180	2	ND (2)	7	ND (2)	728
	04/04/07	10.8		2,000	91	5,500 j	ND (50)	ND (50)	ND (50)		7,591
MW044	08/14/03	10.8	11.5	19	2	9	ND		ND	ND	30
	08/14/03 DUP	10.8		17	2	8	ND		ND	ND	27
	04/28/04	5.5		0.4	ND	210	2		ND	ND	212
	04/28/04	10.8		1	ND	190	1		ND	ND	192
	07/13/05	10.8		3	0.5 j	0.7 j	ND	ND	40	0.2 j	44
	04/02/07	10.8		ND	0.6	3	0.2 j	ND	3.1		7
MW045	08/12/03	13.0	13.0	ND	ND	ND	ND		ND	ND	ND
	05/04/04	13.2		2	3	170	2		27	ND	204
	07/12/05	13.2		0.8 j	0.6 j	6	0.2 j	ND	20	0.1 j	28
	04/02/05	10.8		ND	1.6	2	ND	ND	1.1 j		5
	04/05/07 DUP	10.8		ND	1.6	2	ND	ND	1.0 j		5
MW046	08/08/03	10.0		520	64	95	4		ND	ND	683
	04/27/04	5.0		PURPLE - NOT SAMPLED							
	04/27/04	10.0		PURPLE - NOT SAMPLED							
	07/28/04	10.0		ND	ND	ND	ND		ND	ND	ND
	07/18/05	8.0		ND	ND	45	0.7 j	ND	2	0.1 j	48
MW047	08/11/03	12.5	13.0	81,000	3,300	610	11		13	1	84,935
	04/27/04	5.5		PURPLE - NOT SAMPLED							
	04/27/04	11.5		PURPLE - NOT SAMPLED							
	07/28/04	11.5		ND	ND	ND	ND		ND	ND	ND
	07/18/05	11.5		8.4 j	43	570	3.8 j	ND (10)	7.6 j	ND (10)	633
	04/02/07	11.5		15,000	1,700	2,200	ND (500)	ND (500)	270 j		19,170

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW048	08/13/03	5.0	11.0	67,000	1,400	340	ND		ND	ND	68,740
	08/13/03	11.0		70,000	1,400	300	ND		ND	ND	71,700
	04/26/04	5.0		PURPLE - NOT SAMPLED							
	04/26/04	11.0		PURPLE - NOT SAMPLED							
	07/28/04	11.0		0.5 i	ND	ND	ND		ND	ND	1
	07/18/05	10.0		1,100	110	1,300	15 j	ND (20)	240	ND (20)	2,765
	04/04/07	10.0		28,000	960	3,200	ND (100)	ND (100)	ND (100)		32,160
	09/05/07	8.4		20,000	620	1,600	17	2	100		22,339
MW049	08/11/03	10.5	10.5	2	10	5	ND		ND	ND	17
	04/27/04	10.2		3	1	56	1		ND	ND	61
	07/14/05	7.9		5 j	3 j	380	13	ND (10)	250	ND (10)	651
	07/14/05 DUP	7.9		3.7 j	2 j	390	14	ND (10)	260	ND (10)	670
	04/04/07	7.9		1.0	2	20	0.3 j	ND	7.2 j		31
MW050	08/13/03	12.0	12.0	50	550	47	2		0.5	1	650
	04/29/04	5.0		PURPLE - NOT SAMPLED							
	04/29/04	12.0		PURPLE - NOT SAMPLED							
	07/29/04	8.6		ND	ND	ND	ND		ND	ND	ND
MW051	08/06/03	13.5	13.5	22	110	18	1		ND	ND	151
	04/29/04	5.0		PURPLE - NOT SAMPLED							
	04/29/04	13.5		PURPLE - NOT SAMPLED							
	07/29/04	13.5		ND	ND	ND	ND		ND	ND	ND
	07/18/05	11.6		0.3 j	0.4 j	1	ND	ND	ND	0.5 j	2
MW052	08/06/03	14.1	13.5	180	370	150	5		1.4	ND	706
	04/29/04	6.5		PURPLE - NOT SAMPLED							
	04/29/04	13.5		PURPLE - NOT SAMPLED							
	07/29/04	13.5		30	12	54	ND		ND	ND	96
	07/08/05	9.9		10	2	4	ND	ND	ND	0.1 j	16
	04/04/07	14.0		ND	1	53	1	0.4 j	ND		55
MW053	08/11/03	6.0	14.0	75	21	6	ND		ND	2	104
	08/11/03	13.5		61	22	7	ND		ND	2	92
	05/04/04	13.5		87	46	180	1		ND	1	315
	07/13/05	10.5		2.0 j	54	94	0.5 j	3	20	0.5 j	174
	04/04/07	13.5		ND	34	72	1	2	41		150
MW054	08/12/03	4.0	15.5	58	260	310	8		ND	ND	636
	08/12/03	14.9		99	350	360	10		ND	ND	819
	08/12/03 DUP	14.9		110	310	360	9		ND	ND	789
	04/27/04	7.8		PURPLE - NOT SAMPLED							
	04/27/04	14.9		PURPLE - NOT SAMPLED							
	07/28/04	14.9		ND	ND	ND	ND		ND	ND	ND
MW055	09/27/04	15.0	14.6	13	1	7	ND		ND	ND	21
	07/11/05	15.0		PINK - NOT SAMPLED							
	09/05/07	17.0		3.2	1.2	52	2	ND	1.0 i		59
MW056	09/27/04	13.4	12.0	12	6	98	ND		ND	ND	116
	07/11/05	9.3		3	0.5 j	94	0.2 j	ND	ND	0.1 j	98
	04/04/07	12.5		800	7,100	12,000	150	63	1,100		21,213
MW057	09/28/04	4.8	> 12.0	ND	ND	ND	ND		ND	ND	ND
	07/18/05	8.0		4.6 j	2.7 j	170	4.3 j	ND (5)	15	ND (5)	207
	04/02/07	10.0		6,700	560	1,100	ND (200)	ND (200)	310		8,670
	09/04/07	7.7		2,900	110	520	4	0.8 i	57		3,592
MW058	09/28/04	9.7	12.4	2	ND	1	ND		ND	ND	3
	07/18/05	8.6		PURPLE - NOT SAMPLED							

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
RW008	07/14/05	10.3	12.1	0.7 j	0.2 j	0.3 j	ND	ND	ND	0.1 j	1
RW010	08/13/03	14.0	14.1	ND	ND	ND	ND		ND	1	1
	07/18/05	10.0		0.7 j	0.7 j	2	ND	ND	1.3	0.1 j	5
RW018	09/06/07	7.6		5,600	1,100	1,400	14	5	150		8,269
RW023	09/05/07	7.6		0.7 i	3.3	9	0.3 i	ND	5		18
RW025	08/12/03	12.3	12.4	50	52	34	1		ND	ND	137
	07/13/05	10.0		3	1	1	ND	ND	ND	0.1 j	5
RW029	08/12/03	12.9	13.7	6,700	2,000	640	31		ND	ND	9,371
	07/13/05	10.0		6	7	27	0.3 j	ND (2)	ND (2)	1 j	41
	07/13/05 DUP	10.0		4	6	22	ND (2)	ND (2)	ND (2)	1 j	33
IP-30	04/05/07	10.0	13.5	31	ND (1)	2	ND (1)	ND (1)	ND (1)		33
	04/05/07 DUP	PurgedDry		37	ND (1)	0.4 j	ND (1)	ND (1)	ND (1)		37
PZ-H	04/05/07	7.0 PurgedDry	12.0	130	15	52	ND (1)	ND (1)	3.4		200
UPPER INTERMEDIATE SEMICONFINING ZONE (~10 to 35 ft bls in the Bone Valley Member of the Peace River Formation)											
MW070	07/14/05	31.5	~11.0	2,000	840	94	ND (50)	ND (50)	ND (50)	ND (50)	2,934
	04/04/07	28.6		2,300	1,400	180	ND (25)	ND (25)	ND (25)		3,880
MW071	07/12/05	15.5	11.5	780	37 j	100	ND (50)	ND (50)	1,000	ND (50)	1,880
MW072	07/18/05	Purged Dry	12.0	34,000	2,200	2,600	ND (500)	ND (500)	ND (500)	ND (500)	38,800
	04/05/07			8,800	1,500	7,900	ND (100)	ND (100)	96 j		18,296
MW073	07/14/05	21.5	11.0	88,000	430 j	78 j	ND (500)	ND (500)	ND (500)	ND (500)	88,508
	04/03/07	21.5		80,000	5,700	10,000	ND (1000)	ND (1000)	ND (1000)		95,700
	04/04/07 DUP	21.5		100,000	6,700	14,000	ND (1000)	ND (1000)	ND (1000)		120,700
MW074	07/18/05	31.5	11.0	460	560	90	21	0.3 j	ND	0.1 j	1,131
MW075	07/18/05	Purged Dry		5,000 j	400	700	6 j	ND (20)	ND (20)	ND (20)	6,106
	04/05/07			4,900 j	570	1,000	ND (50)	ND (50)	ND (50)		6,470
MW076	07/14/05	17.5	13.0	530	150	600	6 j	ND (10)	37	ND (10)	1,323
MW077	07/14/05	33.5	14.1	9,500	1,200	110	ND (100)	ND (100)	ND (100)	ND (100)	10,810
	04/03/07	33.5		10,000	980	66 j	ND (100)	ND (100)	ND (100)		11,046
MW078	07/18/05	Purged Dry	12.4	5,200	2,500	840	6 j	ND (20)	ND (20)	ND (20)	8,546
	7/18/05 DUP			6,200	3,000	880	5 j	ND (20)	ND (20)	ND (20)	10,085
	04/05/07			990	2,400	730	14 j	ND (25)	23 j		4,157
MW079	07/18/05	Purged Dry	~12.0	1,800	1,200	1,500	24	ND (20)	ND (20)	ND (20)	4,524
MW080	07/11/05	21.0	11.5	49	160	140	12	ND (5)	ND (5)	ND (5)	361

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
MIDDLE INTERMEDIATE SEMICONFINING ZONE (~35 to 60 ft bls in the Tampa Member of the Arcadia Formation)											
MW011	05/14/97	45.0		7	2	ND	ND		ND		9
	04/17/00	43.0		13	870	100	13		ND		996
	08/29/00	43.0		1,000	850	92	9		ND		1,951
	11/15/02	40.1		727	1,090	158	15	3	1.4	ND	1,994
	08/05/03	40.1		820	770	190	19		1.4	ND	1,800
	04/27/04	40.1		1,500	1,300	250	28		2.4	ND	3,080
	04/27/04 DUP	40.1		910	1,100	250	27		2.5	ND	2,290
	07/11/05	40.1		950	1,200	200	19 j	ND (40)	ND (40)	ND (40)	2,369
	04/02/07	40.1		2,200	2,300	250	22 j	ND (25)	ND (25)		4,772
MW012	05/14/97	45.0		ND	ND	ND	ND		ND		ND
	04/17/00	39.9		ND	2	3	ND		ND		5
	08/27/00	39.9		1	2	3	ND		ND		6
	08/06/03	39.9		ND	1	1	ND		ND	ND	2
MW014	09/16/97	45.0	17.0	93	30	6	ND		ND		129
	04/14/00	47.0		110	320	20	ND		ND		450
	08/28/00	47.0		68	330	17	ND		ND		415
	11/15/02	46.4		25	418	33	4	1	ND	ND	481
	08/06/03	47.0		8	240	30	3		ND	8	289
	04/28/04	47.0		7	290	31	4		ND	ND	332
	07/14/05	47.0		ND (5)	140	21	2 j	ND (5)	ND (5)	ND (5)	163
	04/04/07	47.0		ND (1)	140	22	3	ND (1)	ND (1)		165
MW017	09/16/97	44.0	21.0	19	13	8	ND		ND		40
	04/11/00	45.0		44	38	23	ND		ND		105
	08/25/00	45.0		34	35	22	ND		ND		91
	11/15/02	44.6		15	28	13	1	ND	ND	ND	57
	08/05/03	45.0		4	14	8	ND		ND	ND	26
	07/12/05	45.0		2	14	5	ND	ND	ND	ND	21
	07/12/05 DUP	45.0		2	13	5	0.1 j	ND	ND	0.1 j	20
	04/05/07	45.0		0.5	14	5	ND	ND	ND		20
MW019	09/16/97	45.0	24.0	12	9	2	ND		ND		23
	04/12/00	42.0		ND	180	32	2		ND		214
	08/29/00	42.0		ND	190	34	2		ND		226
	11/22/02	42.1		ND	315	54	6	ND	ND	ND	375
	08/04/03	42.0		ND	230	56	6		0.5	ND	293
	05/04/04	42.0		2	230	58	6		0.4	ND	296
	07/12/05	42.0		ND (4)	160	38	3.7 j	ND (4)	ND (4)	0.4 j	202
	04/02/07	42.0		ND (2)	150	39	5	ND (2)	ND (2)		194
MW020	09/16/97	44.0	24.0	14	11	6	5		ND		36
	04/18/00	44.5		10	54	68	29		ND		161
	08/27/00	44.5		10	63	87	34		ND		194
	08/06/03	44.5		2	51	65	34		1.0	ND	153
	04/04/07	44.5		ND	49	85	16	1	1.0		152
MW023	09/16/97	45.0	18.0	880	195	145	ND		ND		1,220
	04/19/00	42.5		1,400	470	63	ND		ND		1,933
	08/27/00	42.5		160	360	61	3		ND		584
	11/13/02	45.0		425	597	79	4	4	1.1	ND	1,110
	11/13/02 DUP	45.0		594	637	101	5	ND	ND	ND	1,337
	08/07/03	45.0		72	370	220	31		2	4	699
	07/14/05	45.0		71	300	200	18	2	1.5 j	1 j	594
MW034	12/15/02	49.3	13.5	ND	ND	ND	ND	ND	ND	1	1
	08/04/03	49.3		ND	0.3	ND	ND		ND	ND	0.3
	04/02/07	49.3		ND	7.5	1	0.3 j	ND	ND		9

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
MIDDLE INTERMEDIATE SEMICONFINING ZONE (~35 to 60 ft bls in the Tampa Member of the Arcadia Formation)											
MW037	12/17/02	41.0	15.0	ND	ND	ND	ND	ND	ND	ND	ND
MW059	07/14/05	45.0	9.5	350	1,100	310	ND (40)	ND (40)	ND (40)	ND (40)	1,760
	04/03/07	45.0		190	840	73	ND (12)	ND (12)	ND (12)		1,103
MW060	07/12/05	45.0	14.0	ND (20)	830	260	20	ND (20)	ND (20)	ND (20)	1,110
	04/02/07	45.0		300	2,000	190	30	ND (25)	ND (25)		2,520
MW063	07/14/05	45.0	15.0	630	720	260	25	ND (20)	ND (20)	ND (20)	1,635
	07/14/05 DUP	45.0		500	650	250	24	3 j	ND (10)	ND (10)	1,427
	04/02/07	45.0		4,900	1,900	560	29 j	ND (50)	70		7,459
MW064	07/12/05	52.0	12.0	830	420	190	12 j	ND (20)	ND (20)	ND (20)	1,452
	04/02/07	52.0		840	1,000	160 j	12 j	ND (20)	ND (20)		2,012
MW065	07/12/05	45.0	13.0	4,400	2,400	930	ND (80)	ND (80)	ND (80)	ND (80)	7,730
	04/03/07	45.0		12,000	3,300	450 j	ND (100)	ND (100)	ND (100)		15,750
MW067	07/13/05	43.0	11.0	520	690	810	7 j	ND (20)	ND (20)	ND (20)	2,027
	04/02/07	43.0		2,500	1,500	220 j	14 j	ND (25)	ND (25)		4,234
	04/05/07 DUP	43.0		1,700	1,100	230	12 j	ND (25)	ND (25)		3,042
MW069	07/14/05	45.0	13.0	37,000	1,100	150 j	ND (200)	ND (200)	ND (200)	ND (200)	38,250
	04/03/07	45.0		100,000	2,600	280 j	ND (1000)	ND (1000)	ND (1000)		102,880
	04/03/07 DUP	45.0		75,000	2,000	310 j	ND (500)	ND (500)	ND (500)		77,310
PW002	11/22/02	45.5	15.0	1,640	647	178	ND	ND	ND	ND	2,465
	08/08/03	45.5		2,000	770	280	20		2	ND	3,072
	07/13/05	45.5		1,100	990	430	19 j	ND (20)	ND (20)	ND (20)	2,539
	07/13/05 DUP	45.5		560	780	440	17 j	ND (20)	ND (20)	ND (20)	1,797
	04/04/07	45.5		320	660	270	28	ND (10)	ND (10)		1,278
LOWER INTERMEDIATE SEMICONFINING ZONE (~60 to 80 ft bls in the Tampa Member of the Arcadia Formation)											
MW018	09/16/97	70.0	20.0	170	29	13	ND		ND		212
	04/11/00	71.0		1,600	650	150	ND		ND		2,400
	08/25/00	71.0		500	530	120	ND		ND		1,150
	11/15/02	71.0		625	858	237	3	4	2	ND	1,729
	11/15/02 DUP	71.0		442	750	224	3	4	2	ND	1,425
	08/05/03	71.0		380	560	200	2		1.3	ND	1,143
	04/29/04	71.0		200	840	260	3		1.4	ND	1,304
	07/12/05	71.0		23	520	280	3.4 j	ND (10)	ND (10)	ND (10)	826
	04/05/07	71.0		ND (5)	390	280	53	ND (5)	ND (5)		723
MW021	09/16/97	70.0	16.5	220	35	2	ND		ND		257
	04/14/00	68.0		270	130	22	ND		ND		422
	08/31/00	68.0		79	60	25	ND		ND		164
	11/13/02	69.6		181	292	30	ND	ND	ND	ND	503
	08/12/03	70.0		40	240	54	2		ND	0.3	336
	07/13/05	70.0		ND (2)	74	95	2	ND (2)	ND (2)	0.1 j	171
	04/03/07	69.5		ND (2)	43	91 j	25	ND (2)	ND (2)		159
MW022	09/16/97	70.0	25.0	11,900	1,840	1,630	ND		ND		15,370
	04/19/00	68.5		2,600	790	160	12		ND		3,562
	08/27/00	68.5		97	72	27	ND		ND		196
	11/18/02	71.3		52	105	61	4	2	ND		224
	08/08/03	70.0		15	48	39	8		0.4	7	117
	08/08/03 DUP	70.0		15	54	40	9		0.4	5	123
	07/07/05	70.0		PURPLE - NOT SAMPLED							
MW032	12/15/02	72.0	15.0	ND	ND	ND	ND	ND	ND	1	1
MW036	12/17/02	74.0	13.5	ND	ND	ND	ND	ND	ND	ND	ND
	08/04/03	74.0		ND	ND	ND	ND		ND	ND	ND
	04/02/07	68.0		0.3 j	3.6	2	ND	ND	ND		5
MW039	12/16/02	70.0	10.5	ND	ND	ND	ND	ND	ND	ND	ND

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
LOWER INTERMEDIATE SEMICONFINING ZONE (~60 to 80 ft bls in the Tampa Member of the Arcadia Formation)											
MW061	07/11/05	65.0	13.5	860	1,300	820	8 j	ND (40)	ND (40)	ND (40)	2,988
	04/02/07	65.0		460	1,500	520	22	ND (20)	ND (20)		2,502
MW062	07/11/05	65.0	10.0	1,500	760	330	ND (40)	ND (40)	ND (40)	ND (40)	2,590
	04/02/07	65.0		1,200	750	66	7 j	ND (12)	ND (12)		2,023
MW066	07/14/05	61.5	17.0	0.3 j	13	6	0.2 j	ND	ND	0.5 j	20
	04/02/07	61.5		ND	40	14	1	ND	ND		55
MW068	07/12/05	64.0	10.5	22,000	850	ND (400)	ND (400)	ND (400)	ND (400)	ND (400)	22,850
	04/03/07	64.0		36,000	1,800	320 j	ND (250)	ND (250)	ND (250)		38,120
	04/04/07 DUP	64.0		23,000	1,200	200 j	ND (250)	ND (250)	ND (250)		24,400
PW001	11/22/02	60.0	15.0	100	198	184	57	3	3	ND	545
	11/22/02	66.5		49	165	169	58	2	3	ND	446
	08/07/03	60.0		270	240	180	36		1.4	ND	727
	08/07/03	66.5		1,300	540	240	29		2	ND	2,111
	07/13/05	66.3		48	310	89	16	ND (5)	ND (5)	ND (5)	463
	04/03/07	66.5		61	620	150	34	ND (10)	ND (10)		865
UPPER FLORIDAN AQUIFER (Suwannee Limestone)											
MW024	12/08/97	120.0	17.0	ND	ND	ND	ND		ND		ND
	04/19/00	119.0		ND	2	1	ND		ND		3
	08/27/00	119.0		ND	2	1	ND		ND		3
	11/13/02	115.0		ND	3	3	ND	ND	ND	ND	6
	08/07/03	115.0		ND	1	2	ND		ND	ND	3
	07/11/05	115.0		ND	2	4	0.3 j	ND	ND	0.1 j	6
	04/04/07	120.0		ND	1.4	4	0.4 j	ND	ND		6
MW025	12/08/97	118.0	11.0	ND	ND	ND	ND		ND		ND
	04/14/00	117.0		ND	ND	ND	ND		ND		ND
	08/28/00	117.0		ND	ND	ND	ND		ND		ND
	11/15/02	115.7		ND	1	ND	ND	ND	ND	ND	1
	08/07/03	116.0		ND	ND	ND	ND		ND	ND	ND
	07/11/05	116.0		ND	ND	ND	ND	ND	ND	0.2 j	0.2
	04/04/07	116.0		ND	0.3 j	ND	ND	ND	ND		0.3
MW026	12/08/97	123.0	17.0	ND	3	ND	ND		ND		3
	04/11/00	121.0		ND	4	9	1		ND		14
	08/25/00	121.0		ND	4	8	1		ND		13
	11/22/02	120.9		ND	2	12	2	ND	ND	ND	16
	08/05/03	121.0		ND	1	13	2		ND	ND	16
	07/12/05	121.0		ND	0.6 j	16	2	ND	ND	0.1 j	19
	04/05/07	121.0		ND	0.5 j	ND	ND	ND	ND		0.5
MW038	12/16/02	115.0	10.5	ND	ND	ND	ND	ND	ND	ND	ND
UPPER FLORIDAN AQUIFER (Ocala Limestone INJECTION WELL)											
IW001	08/08/03	325.0		ND	ND	ND	ND		ND	ND	ND

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = SHALLOW REMEDIAL SYSTEM OCTOBER 2003 TO SEPTEMBER 2005											
Shallow System Influent / Effluent in Progressive Sequence (Air Stripper Located at Beginning of System Before GACs 1 and 2)	10/20/03	Pre-Air Stripper 1 (Air stripper moved to end of system in the fall of 2005)		4,000	890	270	9		1.2	4	5,174
	01/20/04			2,100	560	360	5		1.4	ND	3,026
	02/23/04			2,600	710	300	6		ND	6	3,622
	05/10/04			210	210	1,000	9		24	4	1,457
	06/22/04			140	110	740	7		75	1	1,073
	07/26/04			150	110	530	6		120	2	918
	05/12/05			2.8	4.7	18	ND		0.4 i	ND	26
	10/20/03	Post-Air Stripper 1 (Shallow system offline from August to October 2005)		ND	ND	ND	ND		ND	ND	ND
	01/20/04			0.4	ND	ND	ND		ND	ND	0.4
	02/23/04			ND	ND	ND	ND		ND	ND	ND
	05/10/04			0.4	0.5	6	ND		ND	ND	7
	06/22/04			1	ND	1	ND		ND	ND	2
	07/26/04			ND	ND	1	ND		ND	ND	1
	05/12/05			ND	ND	ND	ND		ND	ND	ND
	09/22/05			2.5	8.0	87	0.7 i		4.7	ND	103
	10/20/03	Mid-Carbon (Between GAC Canisters 1 & 2)		ND	ND	ND	ND		ND	ND	ND
	01/20/04			ND	ND	ND	ND		ND	ND	ND
	02/23/04			0.3	ND	ND	ND		ND	ND	0.3
	05/10/04			ND	ND	3	ND		ND	ND	3
	06/22/04			0.3	ND	ND	ND		ND	ND	0.3
	07/26/04			ND	ND	1	ND		ND	ND	1
	05/12/05			ND	ND	0.4 i	ND		ND	ND	0.4
	09/22/05			0.3 i	0.7 i	14	ND		1.6	ND	17
	01/20/04	Post-Carbon (After GAC Canister 2) = Final Effluent		ND	ND	ND	ND		ND	ND	ND
	02/23/04			ND	ND	ND	ND		ND	ND	ND
	05/10/04			ND	ND	2	ND		ND	ND	2
	06/22/04			ND	ND	1	ND		ND	ND	1
	07/26/04			ND	ND	1	ND		ND	ND	1
	05/12/05			ND	ND	0.6 i	ND		ND	ND	0.6
	09/22/05			ND	ND	2.7	ND		1.3	ND	4

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = SHALLOW REMEDIAL SYSTEM AFTER OCTOBER 2005											
Shallow System Influent / Effluent in Progressive Sequence (Air Stripper Located at End of System After GAC 1 and 2; GAC Sequence Reversed in July 2007)	06/06/07	Central RW Well Influent (Port 2)		12	18	28	ND	ND	1.7		60
	07/05/07			710	190	180	3	0.6 i	15		1,099
	10/09/07			370	190	220	2	2	6.9		791
	06/06/07	Northwest RW Well Influent (Port 4)		21	28	37	ND	ND	3.7		90
	07/05/07			620	190	160	3	0.6 i	12		986
	10/09/07			350	200	210	2	2	4.7		769
	06/06/07	Combined Influent in Tank (Port 5)		12	17	28	ND	ND	1.6		59
	07/05/07			740	180	170	3	0.6 i	13		1,107
	10/09/07			380	200	230	2	2	4.2		818
	08/08/06	GAC 1 Influent (Port 7)		140	120	150	3		9.3	ND	422
	03/22/07			130	90	130	1.4 j	ND (2.5)	6.0		357
	3/22/07 Split			140	99	140	1.9		9.2	ND	390
	06/06/07			11	17	28	ND	ND	1.7		58
	07/05/07			590	160	150	2.1	0.5 i	12		915
	10/09/07			1.8	1.1	0.7 i	ND	ND	3.7		7
	08/08/06	GAC 2 Influent (Port 8)		0.5 i	0.5 i	5	ND		1.8	ND	9
	03/22/07			2.0	1.8	50	0.3 j	ND	1.2		55
	06/06/07			1.2	2.5	71	0.4 i	ND	0.9 i		76
	07/05/07			0.6 i	0.3 i	ND	ND	ND	1.9		3
	10/09/07			370	190	220	2	1	3.5		787
	08/08/06	Air Stripper 1 Influent (Port 9)		0.3 i	ND	ND	ND		4.4	ND	5
	03/22/07			ND	ND	ND	ND	ND	1.7		2
	06/06/07			ND	ND	ND	ND	ND	1.6		2
	07/05/07			0.2 i	ND	1.0 i	ND	ND	ND		1
	10/09/07			0.8 i	ND	ND	ND	ND	3.7		5
	08/09/06	Air Stripper 1 Effluent (Port 10)		ND	ND	ND	ND		1.9	ND	2
	08/17/06			ND	ND	ND	ND		1.5	ND	2
	03/22/07			ND	ND	ND	ND	ND	ND		ND
	03/22/07 DUP			ND	ND	ND	ND	ND	ND		ND
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND
	10/09/07			ND	ND	ND	ND	ND	ND		ND

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = INTERMEDIATE INFLUENT RECOVERY WELLS											
RW-I1	05/05/04	Screened interval = 43 to 82 ft bls on each intermediate recovery well (Sampled at Compound; RW-I4 deactivated in June 2004) (Ports 11 to 14)		190	190	89	2		ND	ND	471
	09/22/05			53	360	150	7		1.3	ND	571
	08/08/06			100	820	180	12		0.9 I	ND	1,113
	07/05/07			48	590	180	16	2	1.0		837
	10/09/07			33	540	160	16	2	0.9 I		752
RW-I2	05/05/04			3,000	1,300	300	21		2.3	ND	4,623
	05/05/04 DUP			2,900	1,300	290	20		2.1	ND	4,512
	09/22/05			2,300	1,400	310	25		3.3	ND (2)	4,038
	08/08/06			1,500	2,200	330	28		2.3	ND (2)	4,060
	07/05/07			1,600	1,800	390	35	5	3.8		3,834
	10/09/07			1,300	1,800	380	29	4	3.0		3,516
RW-I3	05/05/04			2,500	1,400	220	24		1.8	ND	4,146
	09/22/05			3,300	2,300	260	22		5.6	ND (5)	5,888
	08/08/06			3,300	2,400	240	24		5.2	ND (5)	5,969
	07/05/07			3,400	2,700	330	31	4	6.6		6,472
	10/09/07			3,100	2,700	290	26	4	5.5		6,125
RW-I4	05/05/04			12,000	1,700	200	13		1.4	ND	13,914
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM THROUGH OCTOBER 2004 {Offline from November 2004 to April 2005}											
Intermediate Influent / Effluent in Progressive Sequence	02/23/04	Pre-GAC 3		4,700	1,300	220	15		ND	ND	6,235
	05/10/04			3,000	1,600	240	22		1.9	ND	4,864
	06/22/04			2,200	1,100	200	14		ND	ND	3,514
	07/26/04			1,800	1,200	220	18		1.6	ND	3,240
	02/23/04	Mid-GACs 3 & 4		ND	ND	ND	ND		ND	ND	ND
	05/10/04			0.3	4	120	2		4.0	ND	130
	06/22/04			0.4	12	220	4		4.1	ND	241
	07/26/04			ND	12	280	6		5.2	ND	303
	02/23/04	Mid-GACs 4 & 5		ND	ND	ND	ND		ND	ND	ND
	05/10/04			ND	ND	ND	ND		1.0	ND	1
	06/22/04			ND	ND	ND	ND		ND	ND	ND
	07/26/04			ND	ND	ND	ND		2.3	ND	2
	02/23/04	Post-GAC 5		ND	ND	ND	ND		ND	ND	ND
	05/10/04			ND	ND	ND	ND		ND	ND	ND
	06/22/04			ND	ND	ND	ND		1.1	ND	1
	07/26/04			ND	ND	ND	ND		1.7	ND	2
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM FROM APRIL 2005 THROUGH SEPTEMBER 2005 {Air Stripper Added to the Beginning of the System in April 2005; GAC 3 bypassed after May 2005}											
Intermediate Influent / Effluent in Progressive Sequence	05/12/05	Pre-Air Stripper 2		1,200	1,200	210	21		2.1	ND	2,633
	09/22/05			1,600	1,100	240	17		2.6	ND	2,960
	05/12/05	Pre-GAC 3		6	8	3	ND		ND	ND	16
	05/12/05	Mid-GACs 3 and 4		36	760	440	35		0.3 I	ND	1,271
	09/22/05	Pre-GAC 4		1,700	1,300	240	18		2.8	ND (0.4)	3,261
	05/12/05	Mid-GACs 4 and 5		ND	0.5 I	12	ND		3.1	ND	16
	09/22/05			420	350	240	8		2.3	ND	1,021
	05/12/05	Post-GAC 5		ND	ND	6	ND		2.3	ND	8
	09/22/05			14	11	9	ND		ND	ND	34
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM AFTER SEPT 2005 {Air Stripper Rearranged & GAC 5 Bypassed}											
Intermediate Influent / Effluent in Progressive Sequence	08/08/06	Pre-GAC 3		70	98	29	1		ND	ND	198
	08/08/06	Post-GAC 3		0.6 I	0.8 I	2	ND		0.7 I	ND	4
	08/08/06	Post-GAC 4		9	28	53	2		0.4 I	ND	92
	08/09/06	Post Air Stripper 2		42	80	19	1		ND	ND	142

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM AFTER 08/09/06 (Carbon Replaced with GAC 5 Online)											
Intermediate Influent / Effluent in Progressive Sequence (GAC Sequence Changed in July 2007)	03/22/07	Combined Influent		1,700	1,500	270	24	ND (20)	ND (20)		3,494
	3/22/07 Split			1,100	1,800	310	29		3.9	ND	3,243
	08/17/06	GAC 3 Influent (Port 15)		2,100	2,000	260	23		3.2	ND	4,386
	03/22/07			1,700	1,600	270	20	ND (20)	ND (20)		3,590
	06/06/07			1,800	1,700	280	23	3	4.3		3,811
	07/05/07			2,000	1,800	320	27	3	4.0		4,154
	10/09/07			0.9 i	2.6	1	ND	ND	2.3		7
	08/17/06	GAC 4 Influent (Port 16)		ND	0.3 i	2	ND		0.9 i	ND	3
	03/22/07			ND	ND	0.4 j	ND	ND	0.5 j		1
	06/06/07			ND	2.1	12	ND	ND	4.4		19
	07/05/07			14	16	9	0.4 i	ND	3.7		43
	10/09/07			1,900	2,000	290	25	3	3.7		4,222
	08/17/06	GAC 5 Influent (Port 17)		3.1	17	49	2		0.5 i	ND	72
	03/22/07			4.9	24	25	1	ND	ND		55
	06/06/07			ND	ND	ND	ND	ND	0.6 i		1
	07/05/07			0.9 i	0.5 i	ND	ND	ND	ND		1
	10/09/07			17	64	79	3	0.7 i	4.9		169
	03/22/07	Air Stripper 2 Influent (Port 18)		ND	ND	ND	ND	ND	ND		ND
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND
	10/09/07			ND	ND	ND	ND	ND	ND		ND
	08/17/06	Air Stripper 2 Effluent (Port 19)		0.2 i	0.3 i	1.5	ND		ND	ND	2
	08/17/06 DUP			0.2 i	0.4 i	1.6	ND		ND	ND	2
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND
	10/09/07			0.7 i	0.3 i	ND	ND	ND	ND		1
	03/22/07	F3 Bag Filter Effluent (Port 20)		ND	ND	ND	ND	ND	ND		ND
	03/22/07 DUP			ND	ND	ND	ND	ND	ND		ND
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	

Notes:

blank cell = no datum
µg/L = micrograms per liter
DUP = blind duplicate sample
ft bls = feet below land surface
ft btoc = feet below top-of-casing
VOC = volatile organic compound

i and j suffixes = estimated analytical value reported by laboratory.
ND = Not detected above the laboratory method detection limit for the analyte.
Analytical concentration in parentheses listed after ND denotes alternate laboratory method detection limit different than those listed in Row 5 at the top of the table.

Sampling in 1997 performed by conventional pump and bailer technique, whereas all subsequent sampling performed by the micropurge / low-flow technique.

DCE = dichloroethene
TCE = trichloroethene
PCE = tetrachlororethene
BTEX = Sum of benzene, toluene, ethylbenzene, and xylene; 2003 and 2004 samples only analyzed for TEX; 2005 compound samples only analyzed for TEX; 2007 compound split samples only analyzed for TEX.

Blue shaded dates represent the most recent sampling events in April to September 2007.
Purple shaded dates represent purple or pink groundwater, with sampling via the sodium thiosulfate reducing technique.
Yellow shading indicates analytical concentration exceeds the FDEP Groundwater Cleanup Target Level (CTL).
Green shading indicates analytical concentration exceeds the FDEP Natural Attenuation Default Concentration (NADC).

FDEP = Florida Department of Environmental Protection
FDEP CTLs and NADCs are published in Florida Administrative Code Chapter 62-550 and Chapter 62-777.

Additional groundwater samples were collected on April 4, 2007 from three of the wells most impacted by PCE.
These samples were tested for 1,4-dioxane by Columbia Analytical Services in Jacksonville, FL with the following results:
1,4-Dioxane = 5.1 ug/L at MW068, 11 ug/L at MW069, and 6.6 ug/L at MW073. All results were estimated values.
The FDEP CTL for 1,4-dioxane is 3.2 ug/L.

Carbon changed in the two lag vessels in June 2007.

Data table furnished by Shaw E&I from *Phase II Interim Action Completion Report*, Aug 21, 2007 and updated to include Sept 2007 sampling results.

Table 8

Soil Sampling Results

TABLE 8
SOIL SAMPLING RESULTS
Alaric Superfund Site

2007 Boring	Depth(s)	Total VOCs	Percent Reduction	Paired Boring	Date	Depth	Total VOCs	Paired Boring	Date	Depth	Total VOCs
SB106	1.8	231	99.6					SB055	05/29/03	1.8	54,094
SB107	2.5	68	98.5					SB053	05/29/03	2.5	4,420
SB108	10.8	1,357	10	SB097	04/14/05	10.8	1,504	SB057	05/29/03	1.8	217,000
SB109	5.0	3,000,000						SB058			
	6.2	33,000	94						05/29/03	6.2	5,720,000
	7.0	2,900									
SB110	10.8	2						SB061	05/30/03	10.8	16,777
SB111	11.0	259	99.2	SB099	04/14/05	11.0	31,000	SB056	05/29/03	1.6	201,077
SB112	5.5	1,400	96	SB100	04/14/05	5.5	37,700	SB060	05/30/03		
	9.5	2,062	99.9							9.5	1,651,400
SB113	7.7	3,442	95					SB062	05/30/03	7.7	70,500
SB114	7.0	2	99.9					SB059	05/29/03	7.0	2,592
SB115	6.9	2,454	96					SB063	05/30/03	6.9	64,642
SB116	11.0	5,720	(2.0' zone excavated)					SB064	05/30/03	2.0	4,840
SB117	8.5	100	99	SB103	04/18/05	5.5	38	SB009	08/04/00	8.5	9,200
SB-118	7.5	288	82					SB025	07/20/00	7.5	1,600
	10.5	8									
SB119	8.0	2,908	increase					SB018	07/14/00	8.5	1,000
	9.0	886	11								
	9.5	905									
	10.0	502									
	11.0	104	96						07/14/00	11.5	2,810
	13.0	1,743	11						07/14/00	12.5	1,950
SB120	2.0	ND	100					SB066	05/30/03	2.0	2,150

Notes: All results are total VOC concentrations in soil, in micrograms per kilogram (ug/kg).
VOC concentrations in the yellow shaded cells exceed the ROD cleanup goal of 1,000 ug/kg in 2007.
The 'percent reduction' column refers to the reduction of VOCs in 2007 compared to the earlier soil sampling result.
Blank spaces indicate sample not collected at the location or depth during the dates indicated.

Data in this table is extracted from the Phase II Interim Action Completion Report, Aug 21, 2007 by Shaw E-I.

ATTACHMENTS

Table 2-a: SUMMARY OF PROJECT COSTS
Shallow Soil and Septic System Removal

The table below provides a summary of the costs for each major cost element and a comparison of the actual and projected costs.

Cost Item	ROD Estimate (2002 Dollars)	RD Budget (2003 Dollars)	Actual Cost (2003 Dollars)
Site Reconnaissance	0	$3,668	$5,134
Soil Sampling	0	$34,171	$45,315
Mobilization	0	$10,644	$1,246
Work Plans	0	$10,492	$17,835
Site Excavation	0	$3,975	$6,254
Backfill, Grade, Seed	0	$8,273	$6,016
Septic Tank System	$25,000	$12,230	$23,850
Transportation/Disposal	0	$37,850	$28,395
Demobe/Site Close-out	0	$2,864	$0
Total RA Costs	$25,000	$124,167	$134,045
Difference between total project costs and total ROD cost estimate.	$109,045 or 500% increase		

1 - ROD included a lump sum estimate for the removal and replacement of the septic tank system

Source: Final Remedial Action Report for the Shallow Soil and Septic System Removal, Alaric Area Groundwater Plume Site (EPA, June 2004).

Table 2-b: SUMMARY OF PROJECT COSTS
Treatment of Subsurface Soil by In-situ Chemical Oxidation

Cost Item	ROD Estimate (2002 Dollars)	Actual Cost (2003 Dollars)
Preliminary Design	26,447	17,228
Treatability Testing/Field Tests	2,382	18,894
Health & Safety Plan	3,769	0
Permits	4,256	19,235
Final Design & Specifications	45,853	31,488
Procurement	6,165	28,049
Mobilization/Set-Up	83,157	174,475
Chemical Costs	461,446	426,010
Performance Mon. Well Installation	19,208	41,754
Pre-Characterization Sampling	11,159	17,609
Field Deployment	204,332	484,904
Phase I Injection Monitoring	8,712	-
Field Deployment (Phase II)	38,987	-
Phase II Injection Monitoring	9,191	-
Process monitoring	1,379	-
Post Deployment Monitoring & Report	37,342	-
Demobilization	12,193	8,730
Final Technical Report	30,567	32,771
Shallow GW Recovery System	-	130,760
GW Transportation & Disposal	-	19,052
Subtotal	1,006,545	1,450,959
Contingency (10%)	100,655	n/a
Total RA Cost	$1,107,200	$1,450,959
Difference between total project costs and total ROD cost estimate.	+ $352,759 or + 32 %	

Source: Draft Remedial Action Report for the Treatment of Subsurface Soil by In-Situ Chemical Oxidation (EPA, May 2005).

Table 2-c: SUMMARY OF PROJECT COSTS
Groundwater Containment

The table below provides a summary of the costs for each major cost element and a comparison of the actual and projected costs.

Cost Item	ROD Estimate (2002 Dollars)	Actual Cost (2003 Dollars)
RA Capital Costs	443,200	842,500
RA Operational Cost	212,500	187,006
Total RA Cost	655,700	1,055,042
Projected O & M Cost	850,167	1,172,994
Difference between total project costs and total ROD cost estimate.	$ 399,342 or 61% increase	

Source: *Interim Remedial Action Report for Groundwater Containment at the Alaric Area Groundwater Plume Site* (EPA, March 2006).

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW001	05/14/97	16.0	15.0	9	4	140	7		ND		160
	04/18/00	13.0		2	13	50	7		10		82
	08/27/00	13.0		ND	6	39	5		2		52
	11/18/02	13.4		ND	4	11	2	1	ND	1	19
	08/06/03	16.0		ND	2	8	3		ND	ND	13
	04/26/04	16.0		ND	1	2	1		ND	ND	4
MW002	05/14/97	14.0	12.0	6	200	95	10		ND		311
	04/18/00	12.0		2	43	93	4		10		152
	08/27/00	12.0		8	44	45	10		2		109
	11/13/02	12.2		31	46	27	1	2	ND	3	110
	08/08/03	12.9		25	28	6	0.3		ND	7	66
	04/27/04	12.9		PURPLE - NOT SAMPLED							
	07/28/04	12.9		0.6 i	1	28	ND		ND	ND	30
	07/18/05	12.2		0.6 j	5	26	0.5 j	ND	ND	1 j	33
MW003	05/15/97	16.0	12.5	2,430	1,620	ND	ND		ND		4,050
	04/12/00	11.5		370	480	28	1		ND		879
	08/28/00	11.5		42	80	7	ND		ND		129
	11/14/02	14.5		179	64	3	ND	ND	ND	ND	246
	08/06/03	12.9		6,400	3,300	74	2		ND	0.3	9,776
	05/04/04	12.9		11,000	10,000	350	8		0.9	215	21,574
	07/13/05	12.9		19	230	280	1.7 j	ND (5)	ND (5)	1.3 j	532
	04/03/07	12.5		7.1	160	27	0.8 j	ND (2)	ND (2)		195
	04/03/07	18.0		3.1	50	8	0.3 j	ND	ND		61
MW004	05/15/97	16.0	16.0	31	240	62	5		ND		338
	04/12/00	14.0		250	1,900	360	31		ND		2,541
	08/29/00	14.0		280	630	110	9		ND		1,029
	11/12/02	14.4		1,200	777	197	5	2	ND	5	2,186
	08/07/03	14.4		560	2,800	60	3		ND	1	3,424
	08/07/03 DUP	14.4		490	2,800	63	3		ND	4	3,360
	04/28/04	14.5		50	390	170	16		0.7	ND	627
	07/14/05	14.4		2	6	3	ND	ND	ND	ND	11
	04/02/07	15.0		ND	ND	63	1	ND	56		120
MW005	05/14/97	11.0		ND	ND	ND	ND		ND		ND
	04/18/00	12.5		3	ND	ND	ND		10		13
	08/27/00	12.5		ND	ND	ND	ND		ND		ND
	02/26/03	7.2		1	1	ND	ND	ND	ND	ND	2
	08/06/03	12.5		0.4	ND	ND	ND		ND	0.5	1
	04/27/04	12.5		24	6	2	ND		ND	ND	32
	07/11/05	12.5		4	2	2	ND	ND	ND	ND	8
	09/05/07	12.5		0.3 i	0.6 i	4	ND	ND	ND		5
MW006	05/14/97	8.0	9.5	ND	ND	ND	ND		ND		ND
	04/17/00	7.5		ND	ND	ND	ND		10		10
	08/24/00	7.5		ND	ND	ND	ND		ND		ND
	08/06/03	9.5		ND	ND	ND	ND		ND	ND	ND
	04/27/04	9.5		18,000	4,300	11,000	92		ND	ND	33,392
	07/13/05	7.5		1.4 j	0.7 j	100	1.6 j	ND	5	ND	107
	04/02/07	9.5		ND	0.6	1	ND	ND	0.4 j		2
MW007	05/15/97	7.8	11.5	ND	ND	ND	ND		1		1
	04/12/00	6.0		ND	ND	ND	ND		ND		ND
	08/28/00	6.0		ND	ND	ND	ND		ND		ND
	08/06/03	6.0		ND	1	1	ND		ND	ND	3
	05/04/04	6.0		1	10	18	6		ND	ND	34

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW009	05/14/97	14.0		8,700	735	ND	ND		ND		9,435
	04/19/00	13.0		1,500	280	66	3		ND		1,849
	08/27/00	13.0		3,400	700	450	ND		ND		4,550
	11/18/02	13.2		37,800	11,800	3,160	ND	ND	ND	ND	52,760
	08/06/03	15.2		18,000	3,000	780	29		ND	ND	21,809
	05/05/04	15.2		PURPLE - NOT SAMPLED							
	07/29/04	13.2		0.3 i	ND	ND	ND		ND		ND
	07/15/05	15.2		PURPLE - NOT SAMPLED							
	04/04/07	15.0		27	22	48	1	ND	0.7		98
	09/05/07	15.2		20	11	22	0.5 i	ND	0.3 i		54
MW013	09/16/97	15.0		ND	ND	ND	ND		ND		ND
	04/14/00	12.0		ND	ND	ND	ND		ND		ND
	08/28/00	12.0		12	ND	ND	ND		ND		12
	08/06/03	12.0		ND	ND	ND	ND		ND	ND	ND
	04/28/04	12.0		ND	ND	ND	ND		ND	ND	ND
	07/11/05	12.1		0.7 j	0.4 j	13	0.5 j	ND	ND	0.1 j	15
MW015	09/16/97	15.0	12.0	5	6	4	ND		ND		15
	04/11/00	12.0		14	6	2	ND		10		32
	08/24/00	12.0		26	10	7	ND		ND		43
	02/26/03	10.0		226	779	80	ND	ND	ND	ND	1,085
	02/26/03 DUP	10.0		227	904	85	6	ND	ND	ND	1,222
	08/07/03	14.2		430	460	88	3		0.4	8	989
	04/26/04	14.2		25	29	3	ND		ND	ND	57
	07/11/05	12.2		5	3	0.3 j	ND	ND	ND	ND	8
MW016	09/16/97	15.0		ND	ND	ND	ND		ND		ND
	04/11/00	13.0		ND	ND	ND	ND		ND		ND
	08/25/00	13.0		ND	ND	ND	ND		ND		ND
	02/26/03	10.0		ND	ND	ND	ND	ND	ND	ND	ND
	08/05/03	13.0		ND	ND	ND	ND		ND	ND	ND
	04/29/04	13.0		ND	ND	ND	ND		ND	ND	ND
	07/12/05	13.0		ND	ND	ND	ND	ND	ND	ND	ND
	09/05/07	12.2		0.3 i	ND	ND	ND	ND	ND		0
MW027	09/01/00	13.0	11.5	40,000	13,000	2,900	ND		ND		55,900
	11/13/02	12.9		26,500	1,390	221	ND	ND	ND	ND	28,111
	08/11/03	12.9		32,000	2,800	420	9		ND	ND	35,229
	05/04/04	12.9		PURPLE - NOT SAMPLED							
	07/28/04	12.9		4	ND	ND	ND		ND	ND	4
	07/28/04 DUP	12.9		10	0.7 i	3	ND		ND	ND	13
	07/18/05	12.9		2	4	110	1.3 j	ND	ND	ND	117
	04/03/07	12.9		17	72	200 j	3	ND (1)	91		383
	04/04/07 DUP	12.9		31	87	160	3	0.8	100		382
	09/05/07	12.9		19	60	120	2	1.4	58		261
MW028	09/01/00	11.8	12.4	100	19	ND	ND		ND		119
	11/13/02	11.8		17,800	3,860	152	6	1	2	ND	21,821
				Not accessible as of August 2003 because of overlying Carus trailer.							
	07/18/05	12.3		330	150	3,600	30 j	ND (50)	310	ND (50)	4,420
MW28R			12.4	MW028 replaced in April 2007 because of collapsed screen and infilled fmn sand.							
	05/09/07	10.0		14,000	1,500	2,300	36		220	ND	18,056
MW029	11/13/02	11.6	10.7	6	5	1	ND	ND	ND	1	13
	08/06/03	12.9		110	66	18	0.4		0.4	5	200
	04/28/04	12.9		5	3	39	1		0.4	2	50
	07/12/05	12.9		ND	0.2 j	3	ND	ND	ND	1 j	4
	07/12/05 DUP	12.9		ND	0.3 j	3	ND	ND	ND	2 j	5

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW030	09/01/00	13.0	14.7	ND	ND	ND	ND		ND		ND
	11/15/02	13.5		ND	3	3	ND	ND	ND	ND	6
MW031	11/22/02	13.0	13.0	39,700	3,810	464	ND	ND	ND	ND	43,974
	08/07/03	5.8		7,600	750	85	4		ND	ND	8,439
	08/07/03	12.8		7,800	780	91	3		ND	ND	8,674
	04/28/04	12.8		PURPLE - NOT SAMPLED							
	07/29/04	12.8		ND	ND	ND	ND	ND	ND	ND	ND
	07/15/05	12.8		PURPLE - NOT SAMPLED							
	04/04/07	12.8		7.9	5.9	45	2	ND	0.7		62
MW033	12/15/02	11.0		ND	ND	ND	ND	ND	ND	ND	ND
MW035	12/17/02	9.0	13.0	ND	ND	ND	ND	ND	ND	ND	ND
	08/04/03	9.0		ND	ND	ND	ND		ND	1	1
MW040	03/27/03	10.5		ND	ND	ND	ND	ND	ND	ND	ND
	08/05/03	10.5		ND	ND	ND	ND		ND	ND	ND
	08/05/03 DUP	10.5		ND	ND	ND	ND		ND	ND	ND
	04/29/04	10.5		ND	ND	ND	ND		ND	ND	ND
MW041	03/27/03	16.0		456	804	252	ND		ND		1,512
	08/07/03	16.0		350	510	200	2		0.4	11	1,073
	08/07/03 DUP	16.0		340	510	200	2		0.4	13	1,065
	04/28/04	16.0		240	440	170	2		0.4	5	857
	04/28/04 DUP	16.0		210	450	170	2		0.4	5	837
	07/14/05	16.0		74	140	62	0.9 j	1.7 j	ND	1 j	280
	04/02/07	16.0		53	160	73 j	1.3 j	1.8 j	ND (2)		289
MW042	03/27/03	13.5		1	5	26	1		ND		33
	08/06/03	10.8		1	3	22	1		ND	ND	27
	07/11/05	13.2		ND	0.6 j	2	ND	ND	ND	0.1 j	3
MW043	08/13/03	4.3	11.2	39,000	340	830	ND		ND	ND	40,170
	08/13/03	10.8		36,000	330	790	ND		ND	ND	37,120
	04/26/04	4.3		PURPLE - NOT SAMPLED							
	04/26/04	10.8		PURPLE - NOT SAMPLED							
	07/28/04	4.3		680	780	2,200	130		18	ND	3,808
	07/28/04	10.8		490	960	2,300	97		15	ND	3,862
	07/18/05	10.8		490	49	180	2	ND (2)	7	ND (2)	728
	04/04/07	10.8		2,000	91	5,500 j	ND (50)	ND (50)	ND (50)		7,591
MW044	08/14/03	10.8	11.5	19	2	9	ND		ND	ND	30
	08/14/03 DUP	10.8		17	2	8	ND		ND	ND	27
	04/28/04	5.5		0.4	ND	210	2		ND	ND	212
	04/28/04	10.8		1	ND	190	1		ND	ND	192
	07/13/05	10.8		3	0.5 j	0.7 j	ND	ND	40	0.2 j	44
	04/02/07	10.8		ND	0.6	3	0.2 j	ND	3.1		7
MW045	08/12/03	13.0	13.0	ND	ND	ND	ND		ND	ND	ND
	05/04/04	13.2		2	3	170	2		27	ND	204
	07/12/05	13.2		0.8 j	0.6 j	6	0.2 j	ND	20	0.1 j	28
	04/02/05	10.8		ND	1.6	2	ND	ND	1.1 j		5
	04/05/07 DUP	10.8		ND	1.6	2	ND	ND	1.0 j		5
MW046	08/08/03	10.0		520	64	95	4		ND	ND	683
	04/27/04	5.0		PURPLE - NOT SAMPLED							
	04/27/04	10.0		PURPLE - NOT SAMPLED							
	07/28/04	10.0		ND	ND	ND	ND		ND	ND	ND
	07/18/05	8.0		ND	ND	45	0.7 j	ND	2	0.1 j	48
MW047	08/11/03	12.5	13.0	81,000	3,300	610	11		13	1	84,935
	04/27/04	5.5		PURPLE - NOT SAMPLED							
	04/27/04	11.5		PURPLE - NOT SAMPLED							
	07/28/04	11.5		ND	ND	ND	ND		ND	ND	ND
	07/18/05	11.5		8.4 j	43	570	3.8 j	ND (10)	7.6 j	ND (10)	633
	04/02/07	11.5		15,000	1,700	2,200	ND (500)	ND (500)	270 j		19,170

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
MW048	08/13/03	5.0	11.0	67,000	1,400	340	ND		ND	ND	68,740
	08/13/03	11.0		70,000	1,400	300	ND		ND	ND	71,700
	04/26/04	5.0		PURPLE - NOT SAMPLED							
	04/26/04	11.0		PURPLE - NOT SAMPLED							
	07/28/04	11.0		0.5 i	ND	ND	ND		ND	ND	1
	07/18/05	10.0		1,100	110	1,300	15 j	ND (20)	240	ND (20)	2,765
	04/04/07	10.0		28,000	960	3,200	ND (100)	ND (100)	ND (100)		32,160
	09/05/07	8.4		20,000	620	1,600	17	2	100		22,339
MW049	08/11/03	10.5	10.5	2	10	5	ND		ND	ND	17
	04/27/04	10.2		3	1	56	1		ND	ND	61
	07/14/05	7.9		5 j	3 j	380	13	ND (10)	250	ND (10)	651
	07/14/05 DUP	7.9		3.7 j	2 j	390	14	ND (10)	260	ND (10)	670
	04/04/07	7.9		1.0	2	20	0.3 j	ND	7.2 j		31
MW050	08/13/03	12.0	12.0	50	550	47	2		0.5	1	650
	04/29/04	5.0		PURPLE - NOT SAMPLED							
	04/29/04	12.0		PURPLE - NOT SAMPLED							
	07/29/04	8.6		ND	ND	ND	ND		ND	ND	ND
MW051	08/06/03	13.5	13.5	22	110	18	1		ND	ND	151
	04/29/04	5.0		PURPLE - NOT SAMPLED							
	04/29/04	13.5		PURPLE - NOT SAMPLED							
	07/29/04	13.5		ND	ND	ND	ND		ND	ND	ND
	07/18/05	11.6		0.3 j	0.4 j	1	ND	ND	ND	0.5 j	2
MW052	08/06/03	14.1	13.5	180	370	150	5		1.4	ND	706
	04/29/04	6.5		PURPLE - NOT SAMPLED							
	04/29/04	13.5		PURPLE - NOT SAMPLED							
	07/29/04	13.5		30	12	54	ND		ND	ND	96
	07/08/05	9.9		10	2	4	ND	ND	ND	0.1 j	16
	04/04/07	14.0		ND	1	53	1	0.4 j	ND		55
MW053	08/11/03	6.0	14.0	75	21	6	ND		ND	2	104
	08/11/03	13.5		61	22	7	ND		ND	2	92
	05/04/04	13.5		87	46	180	1		ND	1	315
	07/13/05	10.5		2.0 j	54	94	0.5 j	3	20	0.5 j	174
	04/04/07	13.5		ND	34	72	1	2	41		150
MW054	08/12/03	4.0	15.5	58	260	310	8		ND	ND	636
	08/12/03	14.9		99	350	360	10		ND	ND	819
	08/12/03 DUP	14.9		110	310	360	9		ND	ND	789
	04/27/04	7.8		PURPLE - NOT SAMPLED							
	04/27/04	14.9		PURPLE - NOT SAMPLED							
	07/28/04	14.9		ND	ND	ND	ND		ND	ND	ND
MW055	09/27/04	15.0	14.6	13	1	7	ND		ND	ND	21
	07/11/05	15.0		PINK - NOT SAMPLED							
	09/05/07	17.0		3.2	1.2	52	2	ND	1.0 i		59
MW056	09/27/04	13.4	12.0	12	6	98	ND		ND	ND	116
	07/11/05	9.3		3	0.5 j	94	0.2 j	ND	ND	0.1 j	98
	04/04/07	12.5		800	7,100	12,000	150	63	1,100		21,213
MW057	09/28/04	4.8	> 12.0	ND	ND	ND	ND		ND	ND	ND
	07/18/05	8.0		4.6 j	2.7 j	170	4.3 j	ND (5)	15	ND (5)	207
	04/02/07	10.0		6,700	560	1,100	ND (200)	ND (200)	310		8,670
	09/04/07	7.7		2,900	110	520	4	0.8 i	57		3,592
MW058	09/28/04	9.7	12.4	2	ND	1	ND		ND	ND	3
	07/18/05	8.6		PURPLE - NOT SAMPLED							

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
SURFICIAL AQUIFER (Undifferentiated Silty Sand Overlying the Clay-Rich Bone Valley Member)											
RW008	07/14/05	10.3	12.1	0.7 j	0.2 j	0.3 j	ND	ND	ND	0.1 j	1
RW010	08/13/03	14.0	14.1	ND	ND	ND	ND		ND	1	1
	07/18/05	10.0		0.7 j	0.7 j	2	ND	ND	1.3	0.1 j	5
RW018	09/06/07	7.6		5,600	1,100	1,400	14	5	150		8,269
RW023	09/05/07	7.6		0.7 i	3.3	9	0.3 i	ND	5		18
RW025	08/12/03	12.3	12.4	50	52	34	1		ND	ND	137
	07/13/05	10.0		3	1	1	ND	ND	ND	0.1 j	5
RW029	08/12/03	12.9	13.7	6,700	2,000	640	31		ND	ND	9,371
	07/13/05	10.0		6	7	27	0.3 j	ND (2)	ND (2)	1 j	41
	07/13/05 DUP	10.0		4	6	22	ND (2)	ND (2)	ND (2)	1 j	33
IP-30	04/05/07	10.0	13.5	31	ND (1)	2	ND (1)	ND (1)	ND (1)		33
	04/05/07 DUP	PurgedDry		37	ND (1)	0.4 j	ND (1)	ND (1)	ND (1)		37
PZ-H	04/05/07	7.0 PurgedDry	12.0	130	15	52	ND (1)	ND (1)	3.4		200
UPPER INTERMEDIATE SEMICONFINING ZONE (~10 to 35 ft bls in the Bone Valley Member of the Peace River Formation)											
MW070	07/14/05	31.5	~11.0	2,000	840	94	ND (50)	ND (50)	ND (50)	ND (50)	2,934
	04/04/07	28.6		2,300	1,400	180	ND (25)	ND (25)	ND (25)		3,880
MW071	07/12/05	15.5	11.5	780	37 j	100	ND (50)	ND (50)	1,000	ND (50)	1,880
MW072	07/18/05	Purged Dry	12.0	34,000	2,200	2,600	ND (500)	ND (500)	ND (500)	ND (500)	38,800
	04/05/07			8,800	1,500	7,900	ND (100)	ND (100)	96 j		18,296
MW073	07/14/05	21.5	11.0	88,000	430 j	78 j	ND (500)	ND (500)	ND (500)	ND (500)	88,508
	04/03/07	21.5		80,000	5,700	10,000	ND (1000)	ND (1000)	ND (1000)		95,700
	04/04/07 DUP	21.5		100,000	6,700	14,000	ND (1000)	ND (1000)	ND (1000)		120,700
MW074	07/18/05	31.5	11.0	460	560	90	21	0.3 j	ND	0.1 j	1,131
MW075	07/18/05	Purged Dry		5,000 j	400	700	6 j	ND (20)	ND (20)	ND (20)	6,106
	04/05/07			4,900 j	570	1,000	ND (50)	ND (50)	ND (50)		6,470
MW076	07/14/05	17.5	13.0	530	150	600	6 j	ND (10)	37	ND (10)	1,323
MW077	07/14/05	33.5	14.1	9,500	1,200	110	ND (100)	ND (100)	ND (100)	ND (100)	10,810
	04/03/07	33.5		10,000	980	66 j	ND (100)	ND (100)	ND (100)		11,046
MW078	07/18/05	Purged Dry	12.4	5,200	2,500	840	6 j	ND (20)	ND (20)	ND (20)	8,546
	7/18/05 DUP			6,200	3,000	880	5 j	ND (20)	ND (20)	ND (20)	10,085
	04/05/07			990	2,400	730	14 j	ND (25)	23 j		4,157
MW079	07/18/05	Purged Dry	~12.0	1,800	1,200	1,500	24	ND (20)	ND (20)	ND (20)	4,524
MW080	07/11/05	21.0	11.5	49	160	140	12	ND (5)	ND (5)	ND (5)	361

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
MIDDLE INTERMEDIATE SEMICONFINING ZONE (~35 to 60 ft bls in the Tampa Member of the Arcadia Formation)											
MW011	05/14/97	45.0		7	2	ND	ND		ND		9
	04/17/00	43.0		13	870	100	13		ND		996
	08/29/00	43.0		1,000	850	92	9		ND		1,951
	11/15/02	40.1		727	1,090	158	15	3	1.4	ND	1,994
	08/05/03	40.1		820	770	190	19		1.4	ND	1,800
	04/27/04	40.1		1,500	1,300	250	28		2.4	ND	3,080
	04/27/04 DUP	40.1		910	1,100	250	27		2.5	ND	2,290
	07/11/05	40.1		950	1,200	200	19 j	ND (40)	ND (40)	ND (40)	2,369
	04/02/07	40.1		2,200	2,300	250	22 j	ND (25)	ND (25)		4,772
MW012	05/14/97	45.0		ND	ND	ND	ND		ND		ND
	04/17/00	39.9		ND	2	3	ND		ND		5
	08/27/00	39.9		1	2	3	ND		ND		6
	08/06/03	39.9		ND	1	1	ND		ND	ND	2
MW014	09/16/97	45.0	17.0	93	30	6	ND		ND		129
	04/14/00	47.0		110	320	20	ND		ND		450
	08/28/00	47.0		68	330	17	ND		ND		415
	11/15/02	46.4		25	418	33	4	1	ND	ND	481
	08/06/03	47.0		8	240	30	3		ND	8	289
	04/28/04	47.0		7	290	31	4		ND	ND	332
	07/14/05	47.0		ND (5)	140	21	2 j	ND (5)	ND (5)	ND (5)	163
	04/04/07	47.0		ND (1)	140	22	3	ND (1)	ND (1)		165
MW017	09/16/97	44.0	21.0	19	13	8	ND		ND		40
	04/11/00	45.0		44	38	23	ND		ND		105
	08/25/00	45.0		34	35	22	ND		ND		91
	11/15/02	44.6		15	28	13	1	ND	ND	ND	57
	08/05/03	45.0		4	14	8	ND		ND	ND	26
	07/12/05	45.0		2	14	5	ND	ND	ND	ND	21
	07/12/05 DUP	45.0		2	13	5	0.1 j	ND	ND	0.1 j	20
	04/05/07	45.0		0.5	14	5	ND	ND	ND		20
MW019	09/16/97	45.0	24.0	12	9	2	ND		ND		23
	04/12/00	42.0		ND	180	32	2		ND		214
	08/29/00	42.0		ND	190	34	2		ND		226
	11/22/02	42.1		ND	315	54	6	ND	ND	ND	375
	08/04/03	42.0		ND	230	56	6		0.5	ND	293
	05/04/04	42.0		2	230	58	6		0.4	ND	296
	07/12/05	42.0		ND (4)	160	38	3.7 j	ND (4)	ND (4)	0.4 j	202
	04/02/07	42.0		ND (2)	150	39	5	ND (2)	ND (2)		194
MW020	09/16/97	44.0	24.0	14	11	6	5		ND		36
	04/18/00	44.5		10	54	68	29		ND		161
	08/27/00	44.5		10	63	87	34		ND		194
	08/06/03	44.5		2	51	65	34		1.0	ND	153
	04/04/07	44.5		ND	49	85	16	1	1.0		152
MW023	09/16/97	45.0	18.0	880	195	145	ND		ND		1,220
	04/19/00	42.5		1,400	470	63	ND		ND		1,933
	08/27/00	42.5		160	360	61	3		ND		584
	11/13/02	45.0		425	597	79	4	4	1.1	ND	1,110
	11/13/02 DUP	45.0		594	637	101	5	ND	ND	ND	1,337
	08/07/03	45.0		72	370	220	31		2	4	699
	07/14/05	45.0		71	300	200	18	2	1.5 j	1 j	594
MW034	12/15/02	49.3	13.5	ND	ND	ND	ND	ND	ND	1	1
	08/04/03	49.3		ND	0.3	ND	ND		ND	ND	0.3
	04/02/07	49.3		ND	7.5	1	0.3 j	ND	ND		9

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
MIDDLE INTERMEDIATE SEMICONFINING ZONE (~35 to 60 ft bls in the Tampa Member of the Arcadia Formation)											
MW037	12/17/02	41.0	15.0	ND	ND	ND	ND	ND	ND	ND	ND
MW059	07/14/05	45.0	9.5	350	1,100	310	ND (40)	ND (40)	ND (40)	ND (40)	1,760
	04/03/07	45.0		190	840	73	ND (12)	ND (12)	ND (12)		1,103
MW060	07/12/05	45.0	14.0	ND (20)	830	260	20	ND (20)	ND (20)	ND (20)	1,110
	04/02/07	45.0		300	2,000	190	30	ND (25)	ND (25)		2,520
MW063	07/14/05	45.0	15.0	630	720	260	25	ND (20)	ND (20)	ND (20)	1,635
	07/14/05 DUP	45.0		500	650	250	24	3 j	ND (10)	ND (10)	1,427
	04/02/07	45.0		4,900	1,900	560	29 j	ND (50)	70		7,459
MW064	07/12/05	52.0	12.0	830	420	190	12 j	ND (20)	ND (20)	ND (20)	1,452
	04/02/07	52.0		840	1,000	160 j	12 j	ND (20)	ND (20)		2,012
MW065	07/12/05	45.0	13.0	4,400	2,400	930	ND (80)	ND (80)	ND (80)	ND (80)	7,730
	04/03/07	45.0		12,000	3,300	450 j	ND (100)	ND (100)	ND (100)		15,750
MW067	07/13/05	43.0	11.0	520	690	810	7 j	ND (20)	ND (20)	ND (20)	2,027
	04/02/07	43.0		2,500	1,500	220 j	14 j	ND (25)	ND (25)		4,234
	04/05/07 DUP	43.0		1,700	1,100	230	12 j	ND (25)	ND (25)		3,042
MW069	07/14/05	45.0	13.0	37,000	1,100	150 j	ND (200)	ND (200)	ND (200)	ND (200)	38,250
	04/03/07	45.0		100,000	2,600	280 j	ND (1000)	ND (1000)	ND (1000)		102,880
	04/03/07 DUP	45.0		75,000	2,000	310 j	ND (500)	ND (500)	ND (500)		77,310
PW002	11/22/02	45.5	15.0	1,640	647	178	ND	ND	ND	ND	2,465
	08/08/03	45.5		2,000	770	280	20		2	ND	3,072
	07/13/05	45.5		1,100	990	430	19 j	ND (20)	ND (20)	ND (20)	2,539
	07/13/05 DUP	45.5		560	780	440	17 j	ND (20)	ND (20)	ND (20)	1,797
	04/04/07	45.5		320	660	270	28	ND (10)	ND (10)		1,278
LOWER INTERMEDIATE SEMICONFINING ZONE (~60 to 80 ft bls in the Tampa Member of the Arcadia Formation)											
MW018	09/16/97	70.0	20.0	170	29	13	ND		ND		212
	04/11/00	71.0		1,600	650	150	ND		ND		2,400
	08/25/00	71.0		500	530	120	ND		ND		1,150
	11/15/02	71.0		625	858	237	3	4	2	ND	1,729
	11/15/02 DUP	71.0		442	750	224	3	4	2	ND	1,425
	08/05/03	71.0		380	560	200	2		1.3	ND	1,143
	04/29/04	71.0		200	840	260	3		1.4	ND	1,304
	07/12/05	71.0		23	520	280	3.4 j	ND (10)	ND (10)	ND (10)	826
	04/05/07	71.0		ND (5)	390	280	53	ND (5)	ND (5)		723
MW021	09/16/97	70.0	16.5	220	35	2	ND		ND		257
	04/14/00	68.0		270	130	22	ND		ND		422
	08/31/00	68.0		79	60	25	ND		ND		164
	11/13/02	69.6		181	292	30	ND	ND	ND	ND	503
	08/12/03	70.0		40	240	54	2		ND	0.3	336
	07/13/05	70.0		ND (2)	74	95	2	ND (2)	ND (2)	0.1 j	171
	04/03/07	69.5		ND (2)	43	91 j	25	ND (2)	ND (2)		159
MW022	09/16/97	70.0	25.0	11,900	1,840	1,630	ND		ND		15,370
	04/19/00	68.5		2,600	790	160	12		ND		3,562
	08/27/00	68.5		97	72	27	ND		ND		196
	11/18/02	71.3		52	105	61	4	2	ND		224
	08/08/03	70.0		15	48	39	8		0.4	7	117
	08/08/03 DUP	70.0		15	54	40	9		0.4	5	123
	07/07/05	70.0		PURPLE - NOT SAMPLED							
MW032	12/15/02	72.0	15.0	ND	ND	ND	ND	ND	ND	1	1
MW036	12/17/02	74.0	13.5	ND	ND	ND	ND	ND	ND	ND	ND
	08/04/03	74.0		ND	ND	ND	ND		ND	ND	ND
	04/02/07	68.0		0.3 j	3.6	2	ND	ND	ND		5
MW039	12/16/02	70.0	10.5	ND	ND	ND	ND	ND	ND	ND	ND

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
LOWER INTERMEDIATE SEMICONFINING ZONE (~60 to 80 ft bls in the Tampa Member of the Arcadia Formation)											
MW061	07/11/05	65.0	13.5	860	1,300	820	8 j	ND (40)	ND (40)	ND (40)	2,988
	04/02/07	65.0		460	1,500	520	22	ND (20)	ND (20)		2,502
MW062	07/11/05	65.0	10.0	1,500	760	330	ND (40)	ND (40)	ND (40)	ND (40)	2,590
	04/02/07	65.0		1,200	750	66	7 j	ND (12)	ND (12)		2,023
MW066	07/14/05	61.5	17.0	0.3 j	13	6	0.2 j	ND	ND	0.5 j	20
	04/02/07	61.5		ND	40	14	1	ND	ND		55
MW068	07/12/05	64.0	10.5	22,000	850	ND (400)	ND (400)	ND (400)	ND (400)	ND (400)	22,850
	04/03/07	64.0		36,000	1,800	320 j	ND (250)	ND (250)	ND (250)		38,120
	04/04/07 DUP	64.0		23,000	1,200	200 j	ND (250)	ND (250)	ND (250)		24,400
PW001	11/22/02	60.0	15.0	100	198	184	57	3	3	ND	545
	11/22/02	66.5		49	165	169	58	2	3	ND	446
	08/07/03	60.0		270	240	180	36		1.4	ND	727
	08/07/03	66.5		1,300	540	240	29		2	ND	2,111
	07/13/05	66.3		48	310	89	16	ND (5)	ND (5)	ND (5)	463
	04/03/07	66.5		61	620	150	34	ND (10)	ND (10)		865
UPPER FLORIDAN AQUIFER (Suwannee Limestone)											
MW024	12/08/97	120.0	17.0	ND	ND	ND	ND		ND		ND
	04/19/00	119.0		ND	2	1	ND		ND		3
	08/27/00	119.0		ND	2	1	ND		ND		3
	11/13/02	115.0		ND	3	3	ND	ND	ND	ND	6
	08/07/03	115.0		ND	1	2	ND		ND	ND	3
	07/11/05	115.0		ND	2	4	0.3 j	ND	ND	0.1 j	6
	04/04/07	120.0		ND	1.4	4	0.4 j	ND	ND		6
MW025	12/08/97	118.0	11.0	ND	ND	ND	ND		ND		ND
	04/14/00	117.0		ND	ND	ND	ND		ND		ND
	08/28/00	117.0		ND	ND	ND	ND		ND		ND
	11/15/02	115.7		ND	1	ND	ND	ND	ND	ND	1
	08/07/03	116.0		ND	ND	ND	ND		ND	ND	ND
	07/11/05	116.0		ND	ND	ND	ND	ND	ND	0.2 j	0.2
	04/04/07	116.0		ND	0.3 j	ND	ND	ND	ND		0.3
MW026	12/08/97	123.0	17.0	ND	3	ND	ND		ND		3
	04/11/00	121.0		ND	4	9	1		ND		14
	08/25/00	121.0		ND	4	8	1		ND		13
	11/22/02	120.9		ND	2	12	2	ND	ND	ND	16
	08/05/03	121.0		ND	1	13	2		ND	ND	16
	07/12/05	121.0		ND	0.6 j	16	2	ND	ND	0.1 j	19
	04/05/07	121.0		ND	0.5 j	ND	ND	ND	ND		0.5
MW038	12/16/02	115.0	10.5	ND	ND	ND	ND	ND	ND	ND	ND
UPPER FLORIDAN AQUIFER (Ocala Limestone INJECTION WELL)											
IW001	08/08/03	325.0		ND	ND	ND	ND		ND	ND	ND

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = SHALLOW REMEDIAL SYSTEM OCTOBER 2003 TO SEPTEMBER 2005											
Shallow System Influent / Effluent in Progressive Sequence {Air Stripper Located at Beginning of System Before GACs 1 and 2}	10/20/03	Pre-Air Stripper 1 (Air stripper moved to end of system in the fall of 2005)		4,000	890	270	9		1.2	4	5,174
	01/20/04			2,100	560	360	5		1.4	ND	3,026
	02/23/04			2,600	710	300	6		ND	6	3,622
	05/10/04			210	210	1,000	9		24	4	1,457
	06/22/04			140	110	740	7		75	1	1,073
	07/26/04			150	110	530	6		120	2	918
	05/12/05			2.8	4.7	18	ND		0.4 i	ND	26
	10/20/03	Post-Air Stripper 1 (Shallow system offline from August to October 2005)		ND	ND	ND	ND		ND	ND	ND
	01/20/04			0.4	ND	ND	ND		ND	ND	0.4
	02/23/04			ND	ND	ND	ND		ND	ND	ND
	05/10/04			0.4	0.5	6	ND		ND	ND	7
	06/22/04			1	ND	1	ND		ND	ND	2
	07/26/04			ND	ND	1	ND		ND	ND	1
	05/12/05			ND	ND	ND	ND		ND	ND	ND
	09/22/05			2.5	8.0	87	0.7 i		4.7	ND	103
	10/20/03	Mid-Carbon (Between GAC Canisters 1 & 2)		ND	ND	ND	ND		ND	ND	ND
	01/20/04			ND	ND	ND	ND		ND	ND	ND
	02/23/04			0.3	ND	ND	ND		ND	ND	0.3
	05/10/04			ND	ND	3	ND		ND	ND	3
	06/22/04			0.3	ND	ND	ND		ND	ND	0.3
	07/26/04			ND	ND	1	ND		ND	ND	1
	05/12/05			ND	ND	0.4 i	ND		ND	ND	0.4
	09/22/05			0.3 i	0.7 i	14	ND		1.6	ND	17
	01/20/04	Post-Carbon (After GAC Canister 2) = Final Effluent		ND	ND	ND	ND		ND	ND	ND
	02/23/04			ND	ND	ND	ND		ND	ND	ND
	05/10/04			ND	ND	2	ND		ND	ND	2
	06/22/04			ND	ND	1	ND		ND	ND	1
	07/26/04			ND	ND	1	ND		ND	ND	1
	05/12/05			ND	ND	0.6 i	ND		ND	ND	0.6
	09/22/05			ND	ND	2.7	ND		1.3	ND	4

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = SHALLOW REMEDIAL SYSTEM AFTER OCTOBER 2005											
Shallow System Influent / Effluent in Progressive Sequence (Air Stripper Located at End of System After GAC 1 and 2; GAC Sequence Reversed in July 2007)	06/06/07	Central RW Well Influent (Port 2)		12	18	28	ND	ND	1.7		60
	07/05/07			710	190	180	3	0.6 i	15		1,099
	10/09/07			370	190	220	2	2	6.9		791
	06/06/07	Northwest RW Well Influent (Port 4)		21	28	37	ND	ND	3.7		90
	07/05/07			620	190	160	3	0.6 i	12		986
	10/09/07			350	200	210	2	2	4.7		769
	06/06/07	Combined Influent in Tank (Port 5)		12	17	28	ND	ND	1.6		59
	07/05/07			740	180	170	3	0.6 i	13		1,107
	10/09/07			380	200	230	2	2	4.2		818
	08/08/06	GAC 1 Influent (Port 7)		140	120	150	3		9.3	ND	422
	03/22/07			130	90	130	1.4 j	ND (2.5)	6.0		357
	3/22/07 Split			140	99	140	1.9		9.2	ND	390
	06/06/07			11	17	28	ND	ND	1.7		58
	07/05/07			590	160	150	2.1	0.5 i	12		915
	10/09/07			1.8	1.1	0.7 i	ND	ND	3.7		7
	08/08/06	GAC 2 Influent (Port 8)		0.5 i	0.5 i	5	ND		1.8	ND	9
	03/22/07			2.0	1.8	50	0.3 j	ND	1.2		55
	06/06/07			1.2	2.5	71	0.4 i	ND	0.9 i		76
	07/05/07			0.6 i	0.3 i	ND	ND	ND	1.9		3
	10/09/07			370	190	220	2	1	3.5		787
	08/08/06	Air Stripper 1 Influent (Port 9)		0.3 i	ND	ND	ND		4.4	ND	5
	03/22/07			ND	ND	ND	ND	ND	1.7		2
	06/06/07			ND	ND	ND	ND	ND	1.6		2
	07/05/07			0.2 i	ND	1.0 i	ND	ND	ND		1
	10/09/07			0.8 i	ND	ND	ND	ND	3.7		5
	08/09/06	Air Stripper 1 Effluent (Port 10)		ND	ND	ND	ND		1.9	ND	2
	08/17/06			ND	ND	ND	ND		1.5	ND	2
	03/22/07			ND	ND	ND	ND	ND	ND		ND
	03/22/07 DUP			ND	ND	ND	ND	ND	ND		ND
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND
	10/09/07			ND	ND	ND	ND	ND	ND		ND

Table 3: VOCs in GROUNDWATER

Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = INTERMEDIATE INFLUENT RECOVERY WELLS											
RW-I1	05/05/04	Screened interval = 43 to 82 ft bls on each intermediate recovery well (Sampled at Compound; RW-I4 deactivated in June 2004) (Ports 11 to 14)		190	190	89	2		ND	ND	471
	09/22/05			53	360	150	7		1.3	ND	571
	08/08/06			100	820	180	12		0.9 I	ND	1,113
	07/05/07			48	590	180	16	2	1.0		837
	10/09/07			33	540	160	16	2	0.9 I		752
RW-I2	05/05/04			3,000	1,300	300	21		2.3	ND	4,623
	05/05/04 DUP			2,900	1,300	290	20		2.1	ND	4,512
	09/22/05			2,300	1,400	310	25		3.3	ND (2)	4,038
	08/08/06			1,500	2,200	330	28		2.3	ND (2)	4,060
	07/05/07			1,600	1,800	390	35	5	3.8		3,834
	10/09/07			1,300	1,800	380	29	4	3.0		3,516
RW-I3	05/05/04			2,500	1,400	220	24		1.8	ND	4,146
	09/22/05			3,300	2,300	260	22		5.6	ND (5)	5,888
	08/08/06			3,300	2,400	240	24		5.2	ND (5)	5,969
	07/05/07			3,400	2,700	330	31	4	6.6		6,472
	10/09/07			3,100	2,700	290	26	4	5.5		6,125
RW-I4	05/05/04			12,000	1,700	200	13		1.4	ND	13,914
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM THROUGH OCTOBER 2004 {Offline from November 2004 to April 2005}											
Intermediate Influent / Effluent in Progressive Sequence	02/23/04	Pre-GAC 3		4,700	1,300	220	15		ND	ND	6,235
	05/10/04			3,000	1,600	240	22		1.9	ND	4,864
	06/22/04			2,200	1,100	200	14		ND	ND	3,514
	07/26/04			1,800	1,200	220	18		1.6	ND	3,240
	02/23/04	Mid-GACs 3 & 4		ND	ND	ND	ND		ND	ND	ND
	05/10/04			0.3	4	120	2		4.0	ND	130
	06/22/04			0.4	12	220	4		4.1	ND	241
	07/26/04			ND	12	280	6		5.2	ND	303
	02/23/04	Mid-GACs 4 & 5		ND	ND	ND	ND		ND	ND	ND
	05/10/04			ND	ND	ND	ND		1.0	ND	1
	06/22/04			ND	ND	ND	ND		ND	ND	ND
	07/26/04			ND	ND	ND	ND		2.3	ND	2
	02/23/04	Post-GAC 5		ND	ND	ND	ND		ND	ND	ND
	05/10/04			ND	ND	ND	ND		ND	ND	ND
	06/22/04			ND	ND	ND	ND		1.1	ND	1
	07/26/04			ND	ND	ND	ND		1.7	ND	2
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM FROM APRIL 2005 THROUGH SEPTEMBER 2005 {Air Stripper Added to the Beginning of the System in April 2005; GAC 3 bypassed after May 2005}											
Intermediate Influent / Effluent in Progressive Sequence	05/12/05	Pre-Air Stripper 2		1,200	1,200	210	21		2.1	ND	2,633
	09/22/05			1,600	1,100	240	17		2.6	ND	2,960
	05/12/05	Pre-GAC 3		6	8	3	ND		ND	ND	16
	05/12/05	Mid-GACs 3 and 4		36	760	440	35		0.3 I	ND	1,271
	09/22/05	Pre-GAC 4		1,700	1,300	240	18		2.8	ND (0.4)	3,261
	05/12/05	Mid-GACs 4 and 5		ND	0.5 I	12	ND		3.1	ND	16
	09/22/05			420	350	240	8		2.3	ND	1,021
	05/12/05	Post-GAC 5		ND	ND	6	ND		2.3	ND	8
	09/22/05			14	11	9	ND		ND	ND	34
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM AFTER SEPT 2005 {Air Stripper Rearranged & GAC 5 Bypassed}											
Intermediate Influent / Effluent in Progressive Sequence	08/08/06	Pre-GAC 3		70	98	29	1		ND	ND	198
	08/08/06	Post-GAC 3		0.6 I	0.8 I	2	ND		0.7 I	ND	4
	08/08/06	Post-GAC 4		9	28	53	2		0.4 I	ND	92
	08/09/06	Post Air Stripper 2		42	80	19	1		ND	ND	142

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	
COMPOUND SAMPLES = INTERMEDIATE REMEDIAL SYSTEM AFTER 08/09/06 (Carbon Replaced with GAC 5 Online)											
Intermediate Influent / Effluent in Progressive Sequence (GAC Sequence Changed in July 2007)	03/22/07	Combined Influent		1,700	1,500	270	24	ND (20)	ND (20)		3,494
	3/22/07 Split			1,100	1,800	310	29		3.9	ND	3,243
	08/17/06	GAC 3 Influent (Port 15)		2,100	2,000	260	23		3.2	ND	4,386
	03/22/07			1,700	1,600	270	20	ND (20)	ND (20)		3,590
	06/06/07			1,800	1,700	280	23	3	4.3		3,811
	07/05/07			2,000	1,800	320	27	3	4.0		4,154
	10/09/07			0.9 i	2.6	1	ND	ND	2.3		7
	08/17/06	GAC 4 Influent (Port 16)		ND	0.3 i	2	ND		0.9 i	ND	3
	03/22/07			ND	ND	0.4 j	ND	ND	0.5 j		1
	06/06/07			ND	2.1	12	ND	ND	4.4		19
	07/05/07			14	16	9	0.4 i	ND	3.7		43
	10/09/07			1,900	2,000	290	25	3	3.7		4,222
	08/17/06	GAC 5 Influent (Port 17)		3.1	17	49	2		0.5 i	ND	72
	03/22/07			4.9	24	25	1	ND	ND		55
	06/06/07			ND	ND	ND	ND	ND	0.6 i		1
	07/05/07			0.9 i	0.5 i	ND	ND	ND	ND		1
	10/09/07			17	64	79	3	0.7 i	4.9		169
	03/22/07	Air Stripper 2 Influent (Port 18)		ND	ND	ND	ND	ND	ND		ND
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND
	10/09/07			ND	ND	ND	ND	ND	ND		ND
	08/17/06	Air Stripper 2 Effluent (Port 19)		0.2 i	0.3 i	1.5	ND		ND	ND	2
	08/17/06 DUP			0.2 i	0.4 i	1.6	ND		ND	ND	2
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND
	10/09/07			0.7 i	0.3 i	ND	ND	ND	ND		1
	03/22/07	F3 Bag Filter Effluent (Port 20)		ND	ND	ND	ND	ND	ND		ND
	03/22/07 DUP			ND	ND	ND	ND	ND	ND		ND
	06/06/07			ND	ND	ND	ND	ND	ND		ND
	07/05/07			ND	ND	ND	ND	ND	ND		ND

Table 3: VOCs in GROUNDWATER
Alaric Superfund Site

Sample Location	Sample Date	Collection Depth (ft btoc)	Top-of-Clay Depth (ft bls)	PCE (µg/L)	TCE (µg/L)	cis-1,2-DCE (µg/L)	trans-1,2-DCE (µg/L)	1,1-DCE (µg/L)	Vinyl Chloride (µg/L)	BTEX (µg/L)	Total VOCs (µg/L)
FDEP Groundwater Cleanup Target Level:				3	3	70	100	7	1		
FDEP Natural Attenuation Default Concentration:				300	300	700	1,000	700	100		
Lab Method Detection Limit:				< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<0.20	

Notes:

blank cell = no datum
µg/L = micrograms per liter
DUP = blind duplicate sample
ft bls = feet below land surface
ft btoc = feet below top-of-casing
VOC = volatile organic compound

i and j suffixes = estimated analytical value reported by laboratory.
ND = Not detected above the laboratory method detection limit for the analyte.
Analytical concentration in parentheses listed after ND denotes alternate laboratory method detection limit different than those listed in Row 5 at the top of the table.

Sampling in 1997 performed by conventional pump and bailer technique, whereas all subsequent sampling performed by the micropurge / low-flow technique.

Blue shaded dates represent the most recent sampling events in April to September 2007.
Purple shaded dates represent purple or pink groundwater, with sampling via the sodium thiosulfate reducing technique.
Yellow shading indicates analytical concentration exceeds the FDEP Groundwater Cleanup Target Level (CTL).
Green shading indicates analytical concentration exceeds the FDEP Natural Attenuation Default Concentration (NADC).

FDEP = Florida Department of Environmental Protection
FDEP CTLs and NADCs are published in Florida Administrative Code Chapter 62-550 and Chapter 62-777.

Additional groundwater samples were collected on April 4, 2007 from three of the wells most impacted by PCE.
These samples were tested for 1,4-dioxane by Columbia Analytical Services in Jacksonville, FL with the following results:
1,4-Dioxane = 5.1 ug/L at MW068, 11 ug/L at MW069, and 6.6 ug/L at MW073. All results were estimated values.
The FDEP CTL for 1,4-dioxane is 3.2 ug/L.

Carbon changed in the two lag vessels in June 2007.

DCE = dichloroethene
TCE = trichloroethene
PCE = tetrachlororethene
BTEX = Sum of benzene, toluene, ethylbenzene, and xylene; 2003 and 2004 samples only analyzed for TEX; 2005 compound samples only analyzed for TEX; 2007 compound split samples only analyzed for TEX.

Data table furnished by Shaw E&I from *Phase II Interim Action Completion Report*, Aug 21, 2007 and updated to include Sept 2007 sampling results.

Table 8

Soil Sampling Results

TABLE 8
SOIL SAMPLING RESULTS
Alaric Superfund Site

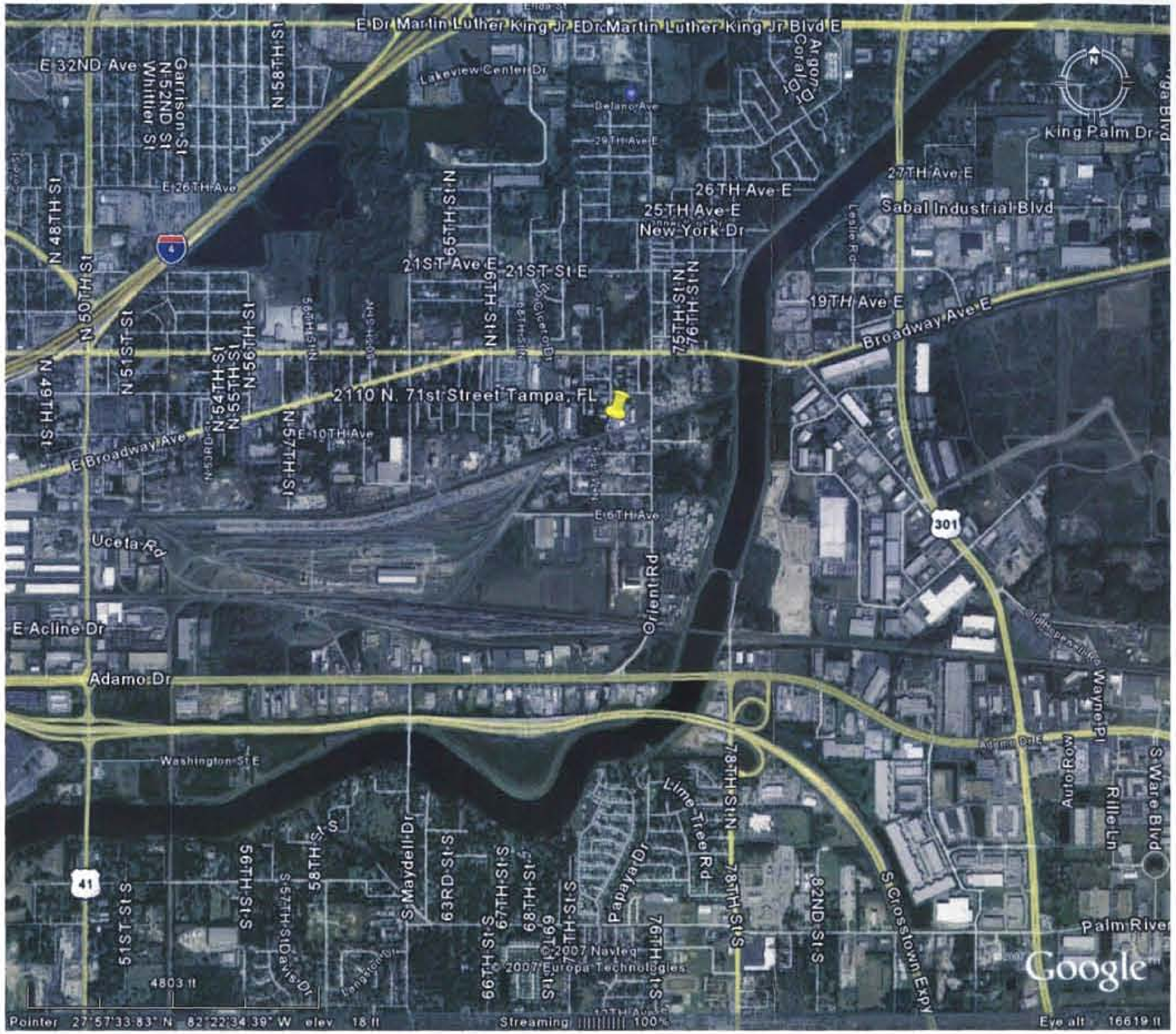
2007 Boring	Depth(s)	Total VOCs	Percent Reduction	Paired Boring	Date	Depth	Total VOCs	Paired Boring	Date	Depth	Total VOCs
SB106	1.8	231	99.6					SB055	05/29/03	1.8	54,094
SB107	2.5	68	98.5					SB053	05/29/03	2.5	4,420
SB108	10.8	1,357	10	SB097	04/14/05	10.8	1,504	SB057	05/29/03	1.8	217,000
SB109	5.0	3,000,000						SB058			
	6.2	33,000	94						05/29/03	6.2	5,720,000
	7.0	2,900									
SB110	10.8	2						SB061	05/30/03	10.8	16,777
SB111	11.0	259	99.2	SB099	04/14/05	11.0	31,000	SB056	05/29/03	1.6	201,077
SB112	5.5	1,400	96	SB100	04/14/05	5.5	37,700	SB060	05/30/03		
	9.5	2,062	99.9							9.5	1,651,400
SB113	7.7	3,442	95					SB062	05/30/03	7.7	70,500
SB114	7.0	2	99.9					SB059	05/29/03	7.0	2,592
SB115	6.9	2,454	96					SB063	05/30/03	6.9	64,642
SB116	11.0	5,720	(2.0' zone excavated)					SB064	05/30/03	2.0	4,840
SB117	8.5	100	99	SB103	04/18/05	5.5	38	SB009	08/04/00	8.5	9,200
SB-118	7.5	288	82					SB025	07/20/00	7.5	1,600
	10.5	8									
SB119	8.0	2,908	increase					SB018	07/14/00	8.5	1,000
	9.0	886	11								
	9.5	905									
	10.0	502									
	11.0	104	96						07/14/00	11.5	2,810
	13.0	1,743	11						07/14/00	12.5	1,950
SB120	2.0	ND	100					SB066	05/30/03	2.0	2,150

Notes: All results are total VOC concentrations in soil, in micrograms per kilogram (ug/kg).
VOC concentrations in the yellow shaded cells exceed the ROD cleanup goal of 1,000 ug/kg in 2007.
The 'percent reduction' column refers to the reduction of VOCs in 2007 compared to the earlier soil sampling result.
Blank spaces indicate sample not collected at the location or depth during the dates indicated.

Data in this table is extracted from the Phase II Interim Action Completion Report, Aug 21, 2007 by Shaw E-I.

ATTACHMENTS

FIGURES AND DRAWINGS



DRAWN BY	CDB 08-10-07	CHECKED BY / APPROVED BY	CPS / CPS	DRAWING NUMBER	FIGURE 3-1

FIGURE 1

SITE LOCATION MAP

ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
AND U.S. ENVIRONMENTAL
PROTECTION AGENCY

Shaw Shaw Environmental, Inc.

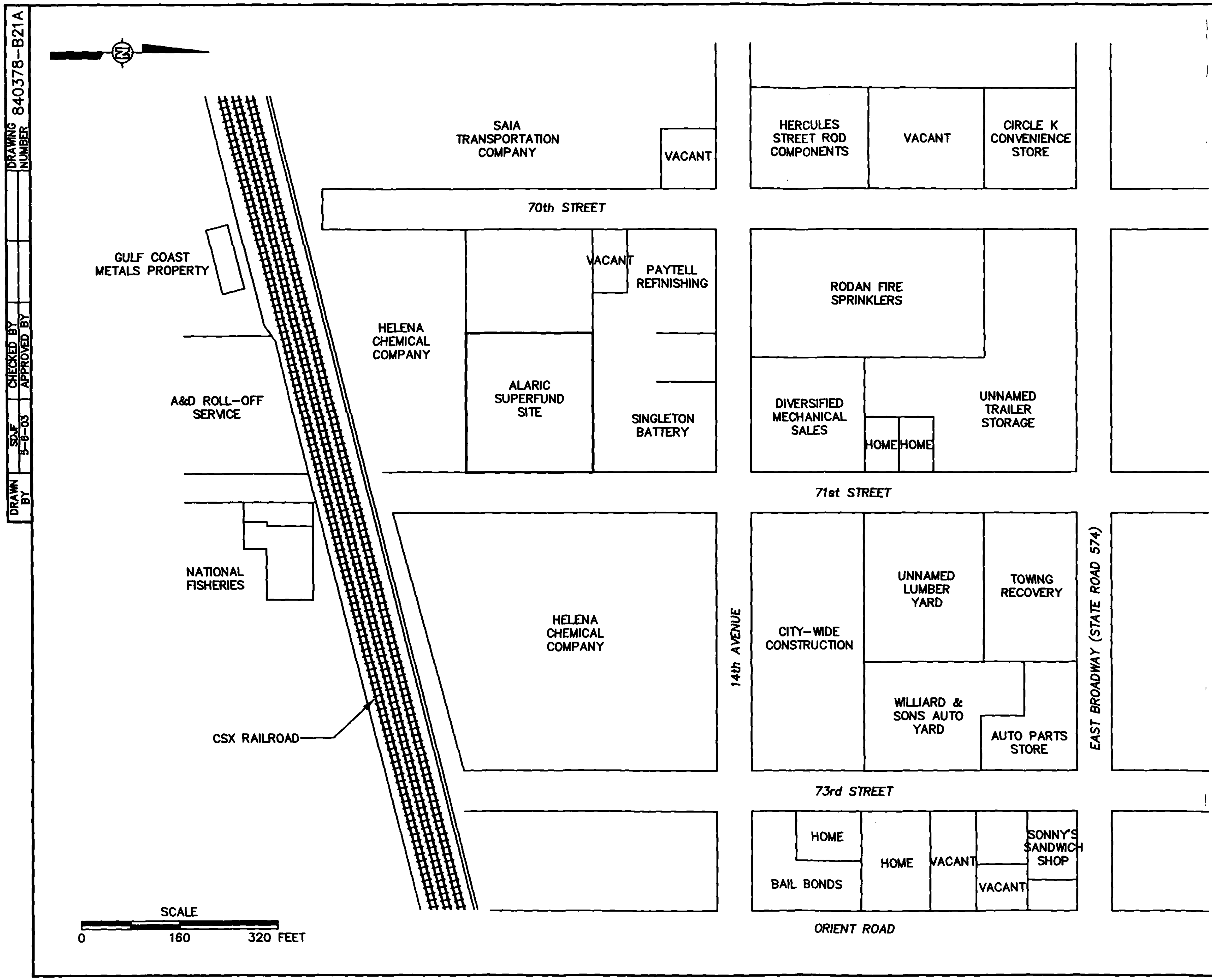


FIGURE 2

LOCAL LAND USE MAP
ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
AND U.S. ENVIRONMENTAL
PROTECTION AGENCY

Shaw Shaw Environmental, Inc.

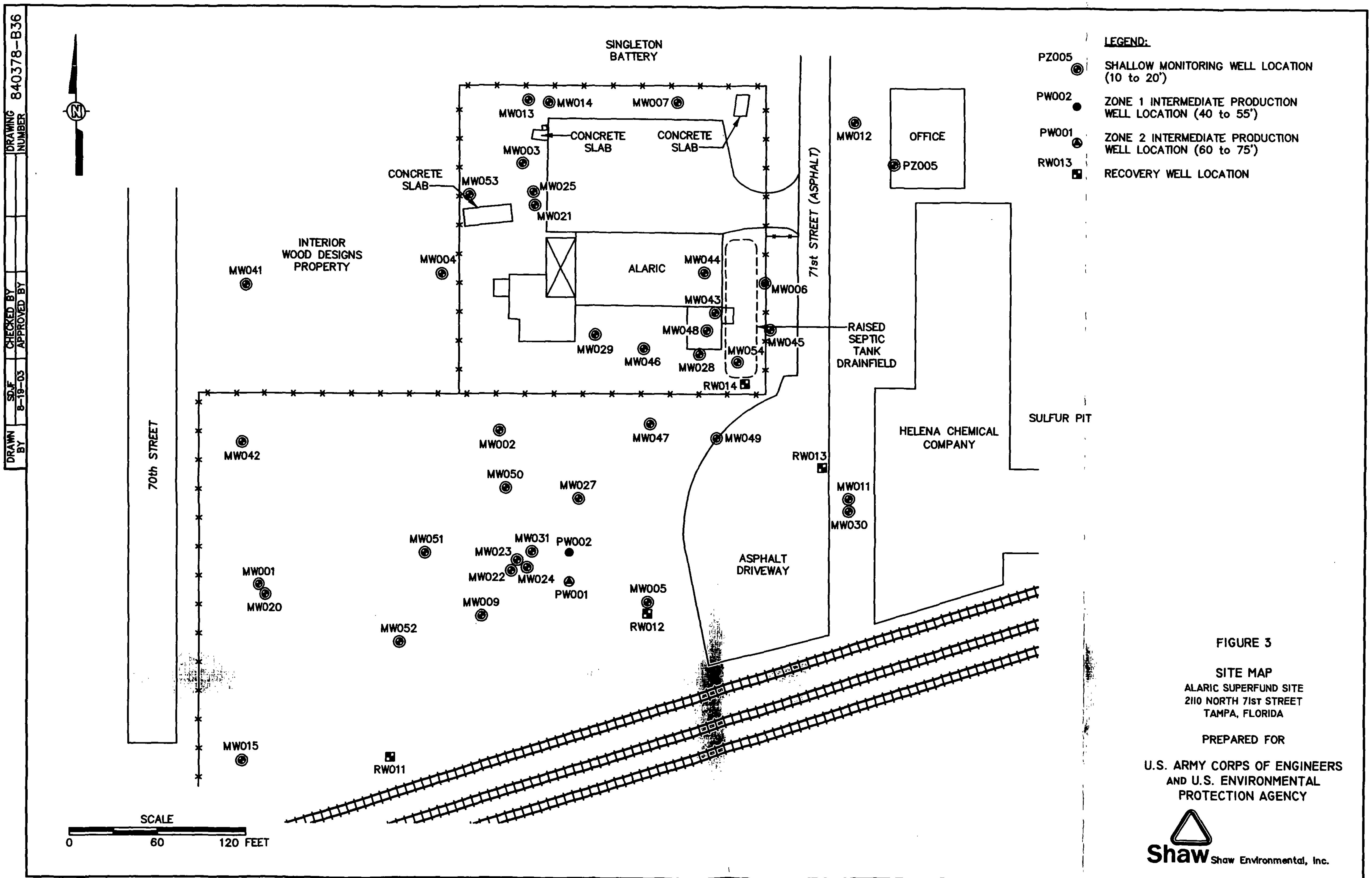
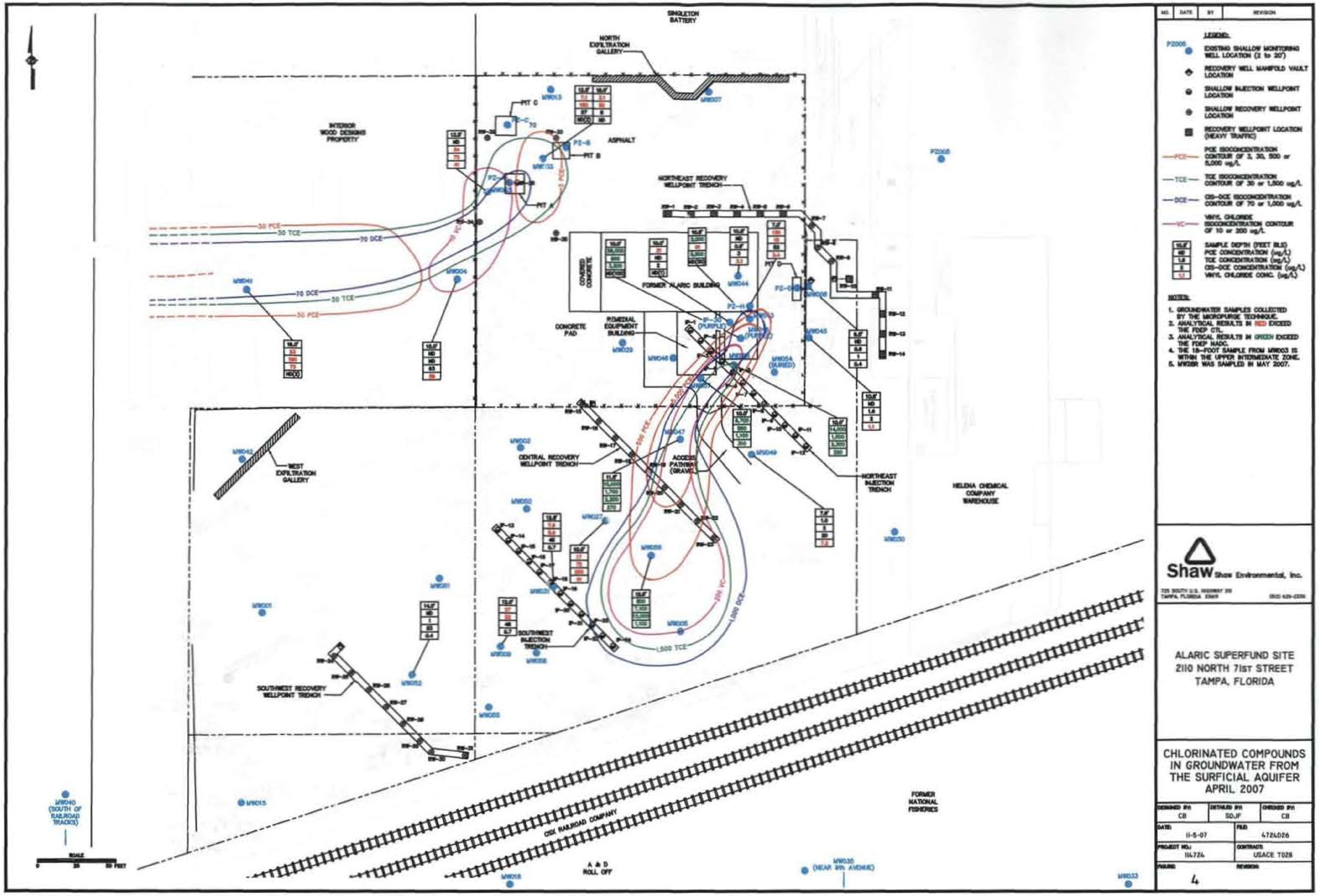


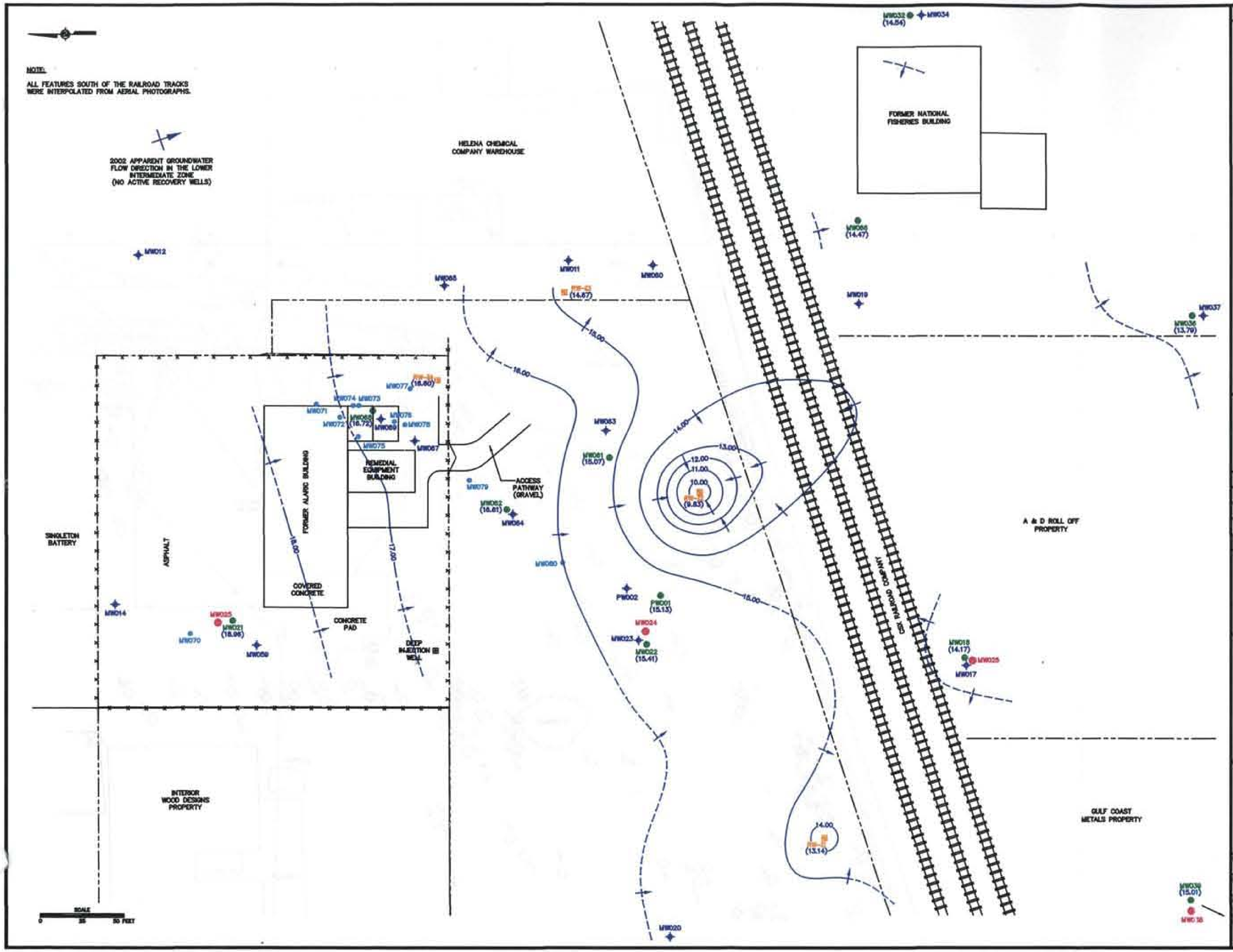
FIGURE 3

SITE MAP
ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
AND U.S. ENVIRONMENTAL
PROTECTION AGENCY


NO. DATE BY REVISION
LEGEND:
P2006
EXISTING SHALLOW MONITORING WELL LOCATION (2 to 20')
RECOVERY WELL MANIFOLD VAULT LOCATION
SHALLOW INJECTION WELLPOINT LOCATION
SHALLOW RECOVERY WELLPOINT LOCATION
RECOVERY WELLPOINT LOCATION (HEAVY TRAFFIC)
PCE ISOCONCENTRATION CONTOUR OF 3, 30, 500 or 5,000 ug/L
TCE ISOCONCENTRATION CONTOUR OF 30 or 1,500 ug/L
CIS-DCE ISOCONCENTRATION CONTOUR OF 70 or 1,000 ug/L
VINYL CHLORIDE ISOCONCENTRATION CONTOUR OF 10 or 200 ug/L
SAMPLE DEPTH (FEET BLS)
PCE CONCENTRATION (ug/L)
TCE CONCENTRATION (ug/L)
CIS-DCE CONCENTRATION (ug/L)
VINYL CHLORIDE CONC. (ug/L)
NOTES:
1. GROUNDWATER SAMPLES COLLECTED BY THE MICROPURGE TECHNIQUE.
2. ANALYTICAL RESULTS IN RED EXCEED THE FDEP CTL.
3. ANALYTICAL RESULTS IN GREEN EXCEED THE FDEP NADC.
4. THE 18-FOOT SAMPLE FROM MW003 IS WITHIN THE UPPER INTERMEDIATE ZONE.
5. MW28R WAS SAMPLED IN MAY 2007.
SINGLETON BATTERY
NORTH EXFILTRATION GALLERY
INTERIOR WOOD DESIGNS PROPERTY
ASPHALT
NORTHEAST RECOVERY WELLPOINT TRENCH
COVERED CONCRETE
FORMER ALARIC BUILDING
CONCRETE PAD
REMEDIAL EQUIPMENT BUILDING
WEST EXFILTRATION GALLERY
CENTRAL RECOVERY WELLPOINT TRENCH
ACCESS PATHWAY (GRAVEL)
NORTHEAST INJECTION TRENCH
HELENA CHEMICAL COMPANY WAREHOUSE
SOUTHWEST INJECTION TRENCH
SOUTHWEST RECOVERY WELLPOINT TRENCH
CSX RAILROAD COMPANY
FORMER NATIONAL FISHERIES
A & D ROLL OFF
MW040 (SOUTH OF RAILROAD TRACKS)
MW035 (NEAR 8th AVENUE)
SCALE
0 25 50 FEET
Shaw Shaw Environmental, Inc.
ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA
CHLORINATED COMPOUNDS IN GROUNDWATER FROM THE SURFICIAL AQUIFER APRIL 2007
DESIGNED BY: CB
DETAILED BY: SDJF
CHECKED BY: CB
DATE: 11-5-07
FILE: 4724D26
PROJECT NO.: 114724
CONTRACT: USACE T028
FIGURE: 4
REVISION:



NO.	DATE	BY	REVISION

LEGEND:

- EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (13 to 35')
- EXISTING MIDDLE INTERMEDIATE ZONE MONITORING WELL LOCATION (40 to 55')
- EXISTING LOWER INTERMEDIATE ZONE MONITORING WELL LOCATION (60 to 80')
- EXISTING DEEP MONITORING WELL LOCATION (115 to 125')
- INTERMEDIATE RECOVERY WELL LOCATION (40 to 80')
- DEEP INJECTION WELL LOCATION (300 to 440')
- (13.79) GROUNDWATER ELEVATION (NAVD88)
- —15.00— GROUNDWATER ELEVATION CONTOUR
- APPARENT GROUNDWATER FLOW DIRECTION

NOTE:

INTERMEDIATE RECOVERY WELL FLOW ON MAY 9, 2007 INCLUDED 2.0 gpm AT RW-21, 2.2 gpm AT RW-22, and 1.4 gpm AT RW-23. RW-24 WAS OFFLINE.

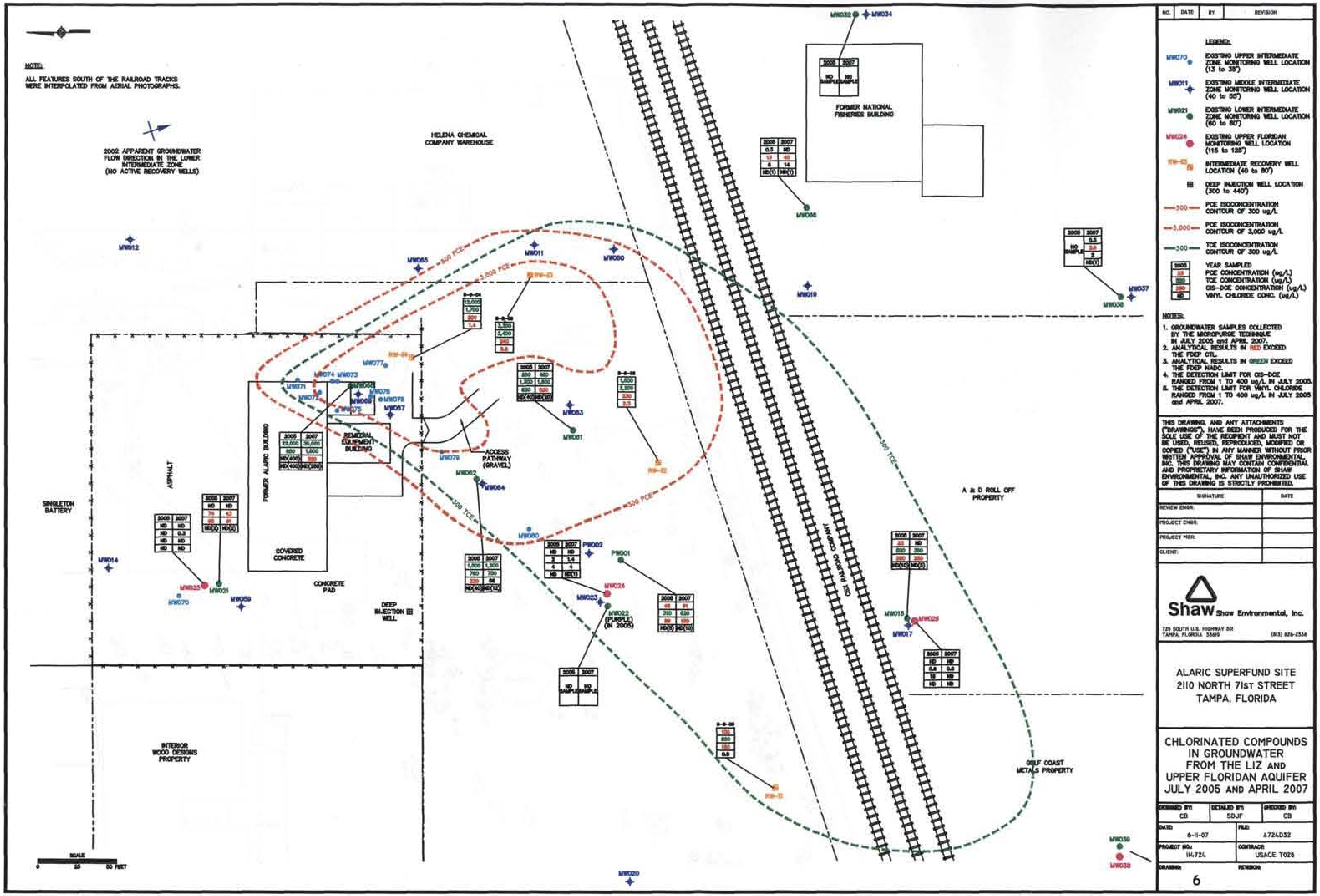
SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

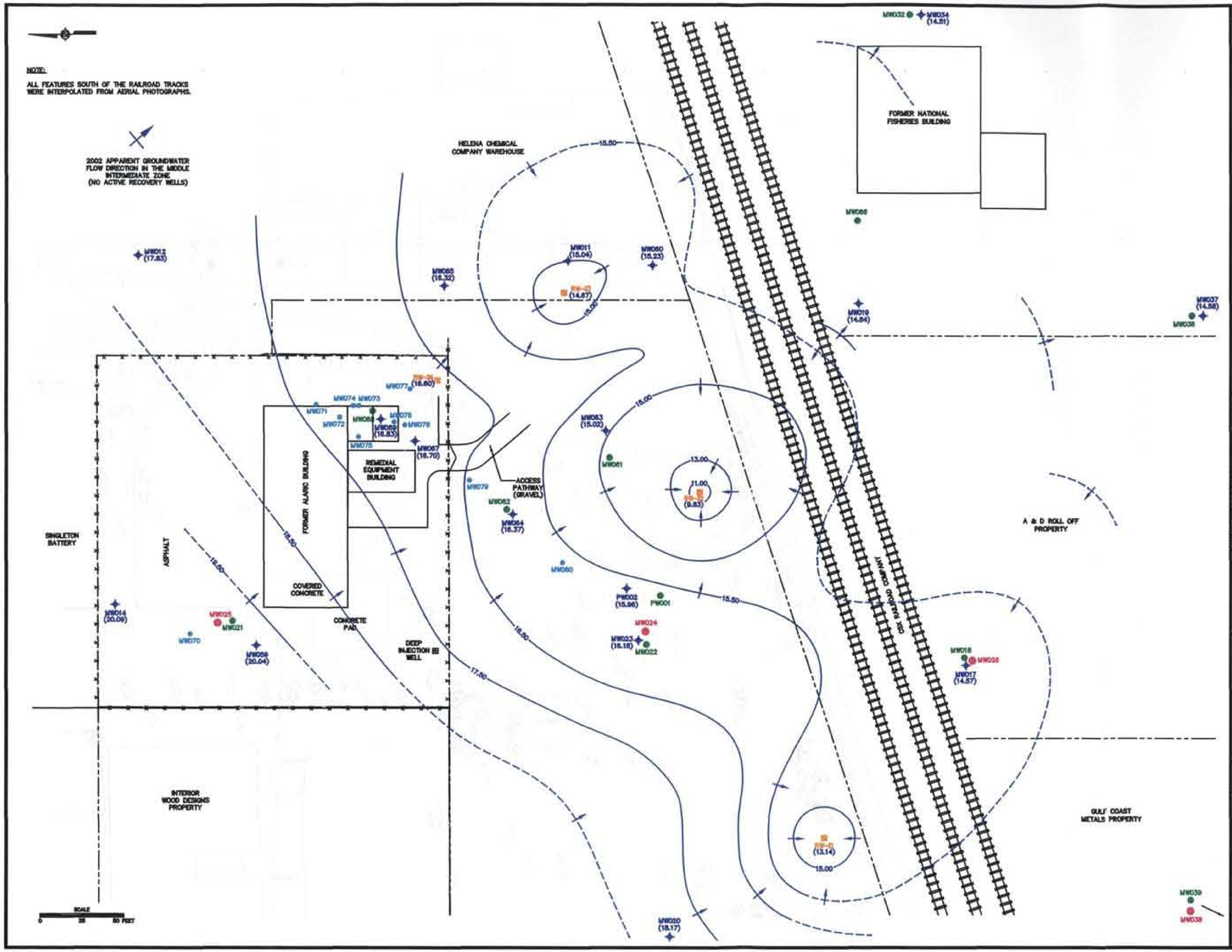
Shaw Environmental, Inc.
725 SOUTH U.S. HIGHWAY 301
TAMPA, FLORIDA 33619
(813) 626-2336

ALARIC SUPERFUND SITE
2110 NORTH 71ST STREET
TAMPA, FLORIDA

WELL DISTRIBUTION AND GROUNDWATER ELEVATIONS IN THE LOWER INTERMEDIATE SEMICONFINING ZONE MAY 9, 2007

DESIGNED BY: CB	DETAILED BY: SDJF	CHECKED BY: CB
DATE: 5-17-07	FILE: 4724D29	
PROJECT NO.: 114724	CONTRACT: USACE T028	
DRAWING: 5	REVISION:	


NOTE:
ALL FEATURES SOUTH OF THE RAILROAD TRACKS WERE INTERPOLATED FROM AERIAL PHOTOGRAPHS.
2002 APPARENT GROUNDWATER FLOW DIRECTION IN THE LOWER INTERMEDIATE ZONE (NO ACTIVE RECOVERY WELLS)
HELENA CHEMICAL COMPANY WAREHOUSE
FORMER NATIONAL FISHERIES BUILDING
SINGLETON BATTERY
ASPHALT
FORMER ALARIC BUILDING
REMEDIAL EQUIPMENT BUILDING
COVERED CONCRETE
CONCRETE PAD
DEEP INJECTION WELL
ACCESS PATHWAY (GRAVEL)
INTERIOR WOOD DESIGNS PROPERTY
A & D ROLL OFF PROPERTY
GULF COAST METALS PROPERTY
300 PCE
3,000 PCE
300 TCE
SCALE
0 25 50 FEET
NO. DATE BY REVISION
LEGEND:
EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (13 to 35')
EXISTING MIDDLE INTERMEDIATE ZONE MONITORING WELL LOCATION (40 to 55')
EXISTING LOWER INTERMEDIATE ZONE MONITORING WELL LOCATION (60 to 80')
EXISTING UPPER FLORIDAN MONITORING WELL LOCATION (115 to 125')
INTERMEDIATE RECOVERY WELL LOCATION (40 to 80')
DEEP INJECTION WELL LOCATION (300 to 440')
PCE ISOCONCENTRATION CONTOUR OF 300 ug/L
PCE ISOCONCENTRATION CONTOUR OF 3,000 ug/L
TCE ISOCONCENTRATION CONTOUR OF 300 ug/L
YEAR SAMPLED
PCE CONCENTRATION (ug/L)
TCE CONCENTRATION (ug/L)
CIS-DCE CONCENTRATION (ug/L)
VINYL CHLORIDE CONC. (ug/L)
NOTES:
1. GROUNDWATER SAMPLES COLLECTED BY THE MICROPURGE TECHNIQUE IN JULY 2005 and APRIL 2007.
2. ANALYTICAL RESULTS IN RED EXCEED THE FDEP CTL.
3. ANALYTICAL RESULTS IN GREEN EXCEED THE FDEP NADC.
4. THE DETECTION LIMIT FOR CIS-DCE RANGED FROM 1 TO 400 ug/L IN JULY 2005.
5. THE DETECTION LIMIT FOR VINYL CHLORIDE RANGED FROM 1 TO 400 ug/L IN JULY 2005 and APRIL 2007.
THIS DRAWING, AND ANY ATTACHMENTS ("DRAWINGS"), HAVE BEEN PRODUCED FOR THE SOLE USE OF THE RECIPIENT AND MUST NOT BE USED, REUSED, REPRODUCED, MODIFIED OR COPIED ("USE") IN ANY MANNER WITHOUT PRIOR WRITTEN APPROVAL OF SHAW ENVIRONMENTAL, INC. THIS DRAWING MAY CONTAIN CONFIDENTIAL AND PROPRIETARY INFORMATION OF SHAW ENVIRONMENTAL, INC. ANY UNAUTHORIZED USE OF THIS DRAWING IS STRICTLY PROHIBITED.
SIGNATURE DATE
REVIEW ENGR:
PROJECT ENGR:
PROJECT MGR:
CLIENT:
Shaw Shaw Environmental, Inc.
ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA
CHLORINATED COMPOUNDS IN GROUNDWATER FROM THE LIZ AND UPPER FLORIDAN AQUIFER JULY 2005 AND APRIL 2007
DESIGNED BY: CB
DETAILED BY: SDJF
CHECKED BY: CB
DATE: 6-11-07
FILE: 4724D32
PROJECT NO.: 114724
CONTRACT: USACE T028
DRAWING: 6
REVISION:



NO	DATE	BY	REVISION

LEGEND:

- MW070 EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (13 to 35')
- MW011 EXISTING MIDDLE INTERMEDIATE ZONE MONITORING WELL LOCATION (40 to 55')
- MW021 EXISTING LOWER INTERMEDIATE ZONE MONITORING WELL LOCATION (60 to 80')
- MW024 EXISTING DEEP MONITORING WELL LOCATION (115 to 125')
- RW-21 INTERMEDIATE RECOVERY WELL LOCATION (40 to 80')
- DEEP INJECTION WELL LOCATION (300 to 440')
- (15.35) GROUNDWATER ELEVATION (NAVD88)
- —20.00— GROUNDWATER ELEVATION CONTOUR
- APPARENT GROUNDWATER FLOW DIRECTION

NOTE:

INTERMEDIATE RECOVERY WELL FLOW ON MAY 9, 2007 INCLUDED 2.0 gpm AT RW-21, 2.2 gpm AT RW-22, and 1.4 gpm AT RW-23. RW-24 WAS OFFLINE.

SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

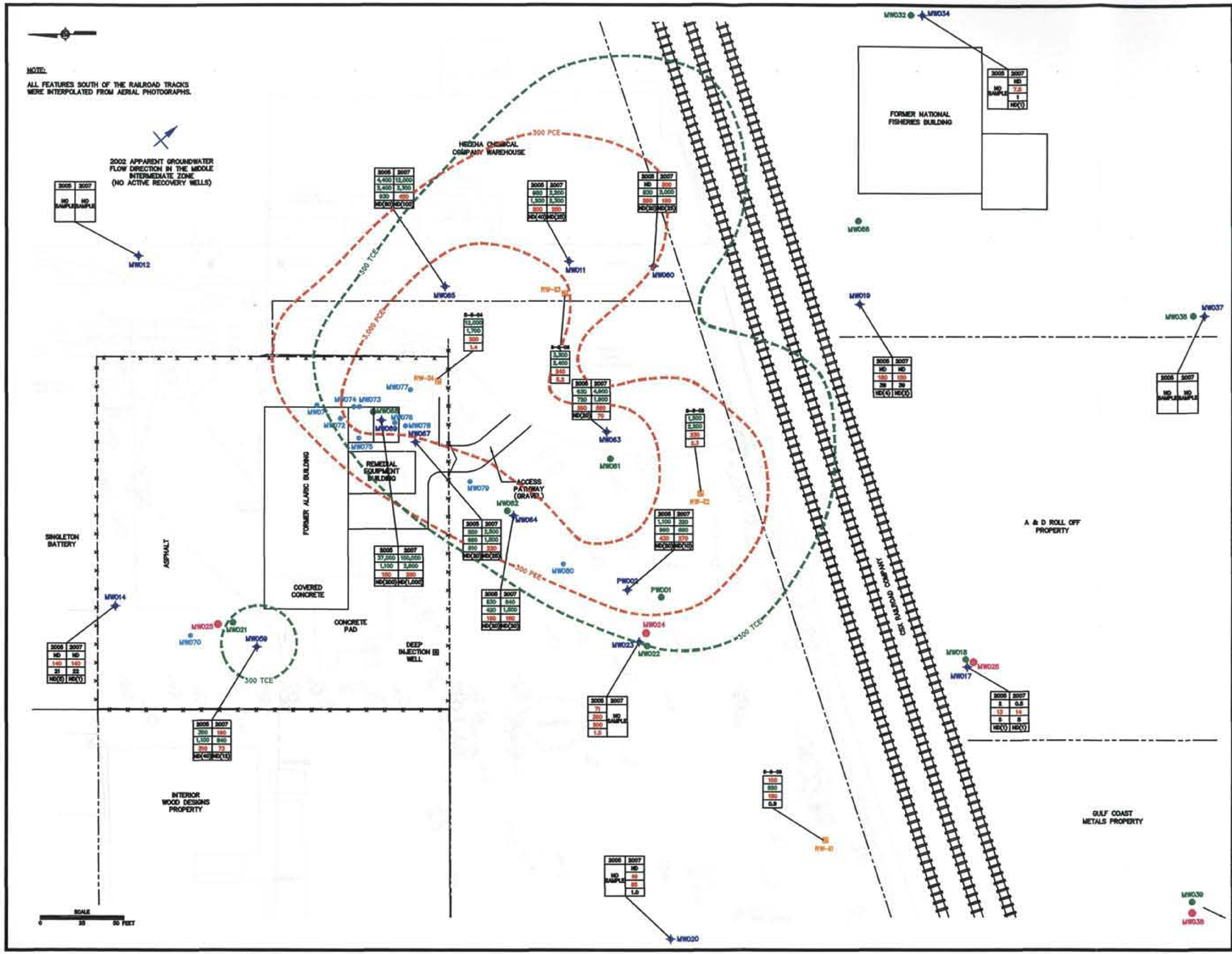
Shaw Environmental, Inc.
725 SOUTH U.S. HIGHWAY 301
TAMPA, FLORIDA 33619
(813) 626-2336

ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA

WELL DISTRIBUTION AND GROUNDWATER ELEVATIONS IN THE MIDDLE INTERMEDIATE SEMICONFINING ZONE MAY 9, 2007

DESIGNED BY:	DETAILED BY:	CHECKED BY:
CB	SDJF	CB

DATE: 5-17-07	FILE: 4724028
PROJECT NO.: 114724	CONTRACT: USACE T028
DRAWING: 7	REVISION:



NO. | DATE | BY | REVISION

LEGEND:

MW070 EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (13 to 35')

MW011 EXISTING MIDDLE INTERMEDIATE ZONE MONITORING WELL LOCATION (40 to 55')

MW021 EXISTING LOWER INTERMEDIATE ZONE MONITORING WELL LOCATION (60 to 80')

MW024 EXISTING UPPER FLORIDAN MONITORING WELL LOCATION (115 to 125')

RW-33 INTERMEDIATE RECOVERY WELL LOCATION (40 to 80')

300 PCE ISOCONCENTRATION CONTOUR OF 300 ug/L

3,000 PCE ISOCONCENTRATION CONTOUR OF 3,000 ug/L

300 TCE ISOCONCENTRATION CONTOUR OF 300 ug/L

2005 YEAR SAMPLED
830 PCE CONCENTRATION (ug/L)
420 TCE CONCENTRATION (ug/L)
180 CIS-DCE CONCENTRATION (ug/L)
ND VINYL CHLORIDE CONC. (ug/L)

NOTES:

1. GROUNDWATER SAMPLES COLLECTED BY THE MICROPURGE TECHNIQUE IN JULY 2005 and APRIL 2007.
2. ANALYTICAL RESULTS IN RED EXCEED THE FDEP CTL.
3. ANALYTICAL RESULTS IN GREEN EXCEED THE FDEP NADC.
4. THE DETECTION LIMIT FOR VINYL CHLORIDE RANGED FROM 1 TO 1,000 ug/L IN JULY 2005 and APRIL 2007.

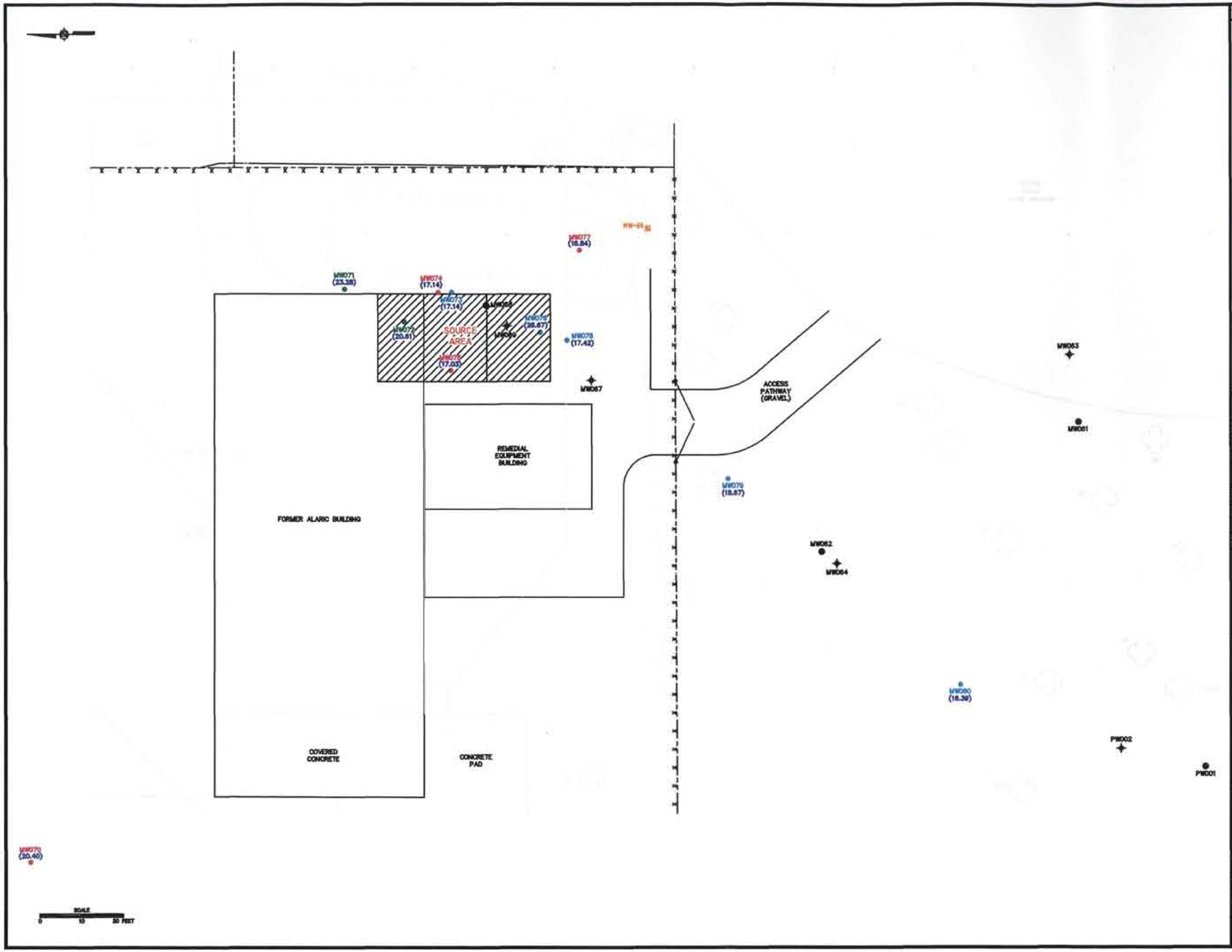
SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Shaw Environmental, Inc.
725 SOUTH U.S. HIGHWAY 301
TAMPA, FLORIDA 33619
(813) 626-2336

ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA

CHLORINATED COMPOUNDS IN GROUNDWATER FROM THE MIZ JULY 2005 AND APRIL 2007

DESIGNED BY: CB	DETAILED BY: SDJF	CHECKED BY: CB
DATE: 6-12-07	FILE: 4724D31	
PROJECT NO.: 114724	CONTRACT: USACE T028	
DRAWING: 8	REVISION:	



NO.	DATE	BY	REVISION

LEGEND:

MW071 — EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (12 to 18')

MW073 — EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (15 to 25')

MW075 — EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (25 to 35')

(10.16) — GROUNDWATER ELEVATION (NAVD88)

MW011 — EXISTING MIDDLE INTERMEDIATE ZONE MONITORING WELL LOCATION (40 to 55')

MW021 — EXISTING LOWER INTERMEDIATE ZONE MONITORING WELL LOCATION (60 to 80')

RW-03 — INTERMEDIATE RECOVERY WELL LOCATION (40 to 80')

NOTE:

UPPER INTERMEDIATE ZONE WELLS THAT PURGED DRY UNDER LOW-FLOW MICROPURGING INCLUDED MW072, MW075, MW078, and MW079 DURING THE 2005 and/or 2007 SAMPLING EVENTS.

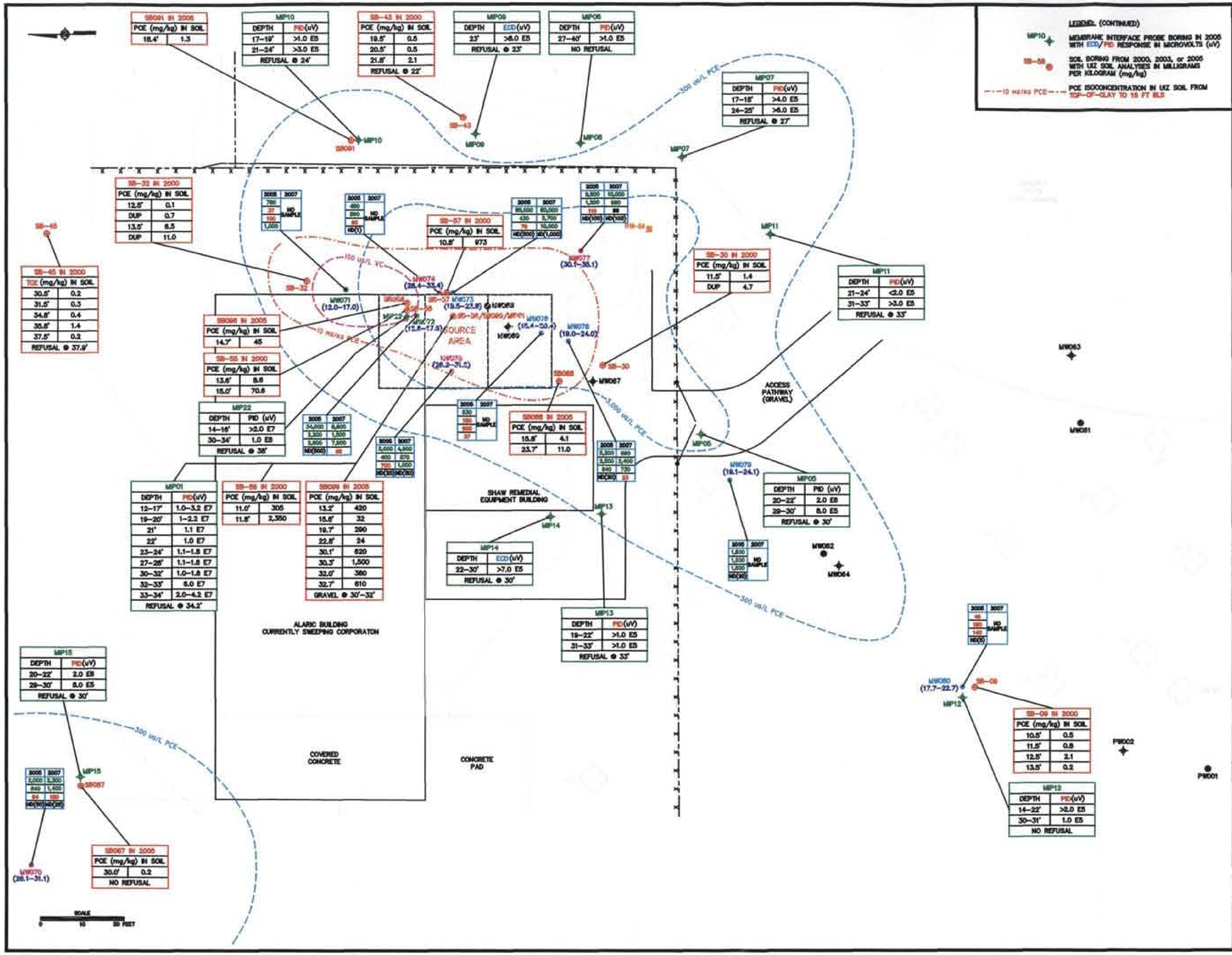
SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Shaw Shaw Environmental, Inc.
725 SOUTH U.S. HIGHWAY 301
TAMPA, FLORIDA 33619
(813) 626-2336

ALARIC SUPERFUND SITE
2110 NORTH 71st STREET
TAMPA, FLORIDA

WELL DISTRIBUTION AND GROUNDWATER ELEVATIONS IN THE UPPER INTERMEDIATE SEMICONFINING ZONE MAY 9, 2007

DESIGNED BY: CB	DETAILED BY: SDJF	CHECKED BY: CB
DATE: 5-16-07	FILE: 4724027	
PROJECT NO.: 114724	CONTRACT: USACE T028	
DRAWING: 9	REVISION:	



NO.	DATE	BY	REVISION

LEGEND:

- MW071 — EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (12 to 18')
- MW073 — EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (15 to 25')
- MW075 — EXISTING UPPER INTERMEDIATE ZONE MONITORING WELL LOCATION (25 to 35')
- MW011 — EXISTING MIDDLE INTERMEDIATE ZONE MONITORING WELL LOCATION (40 to 55')
- MW021 — EXISTING LOWER INTERMEDIATE ZONE MONITORING WELL LOCATION (60 to 80')
- RW-03 — INTERMEDIATE RECOVERY WELL LOCATION (40 to 80')
- —300— PCE ISOCONCENTRATION GROUNDWATER CONTOUR OF 300 ug/L
- —3,000— PCE ISOCONCENTRATION GROUNDWATER CONTOUR OF 3,000 ug/L
- —100— VINYL CHLORIDE ISOCONCENTRATION GROUNDWATER CONTOUR OF 100 ug/L
- 2005 — YEAR SAMPLED; 1,000 — PCE CONCENTRATION (ug/L); 1,000 — TCE CONCENTRATION (ug/L); 1,000 — CIS-DCE CONCENTRATION (ug/L); ND — VINYL CHLORIDE CONC. (ug/L)

NOTES:

1. THE UIZ SCREENED INTERVAL IS LISTED IN PARENTHESES BELOW THE WELL NAME IN FEET BTOC.
2. GROUNDWATER SAMPLES COLLECTED BY THE MICROPURGE TECHNIQUE IN JULY 2005 AND APRIL 2007.
3. GROUNDWATER ANALYTICAL RESULTS IN RED EXCEED THE FDEP CTL.
4. GROUNDWATER ANALYTICAL RESULTS IN GREEN EXCEED THE FDEP NADC.
5. THE GROUNDWATER DETECTION LIMIT FOR VINYL CHLORIDE RANGED FROM 1 TO 1,000 ug/L IN JULY 2005 AND APRIL 2007.

SIGNATURE	DATE
REVIEW ENGR:	
PROJECT ENGR:	
PROJECT MGR:	
CLIENT:	

Shaw Shaw Environmental, Inc.
725 SOUTH U.S. HIGHWAY 301
TAMPA, FLORIDA 33619
(813) 626-2336

ALARIC SUPERFUND SITE
2110 NORTH 71ST STREET
TAMPA, FLORIDA

CHLORINATED COMPOUNDS IN GROUNDWATER (2005 AND 2007) AND SOIL (2000 & 2005) WITH SELECTED MIP RESULTS (2005) FROM THE UIZ

DESIGNED BY: CB	DETAILED BY: SDJF	CHECKED BY: CB
DATE: 6-11-07	FILE: 4724D30	
PROJECT NO.: 114724	CONTRACT: USACE T028	
DRAWING: 10	REVISION:	

Lower Intermediate Aquifer (UIA) Potentiometric Map (Select Wells) - 4/21/04

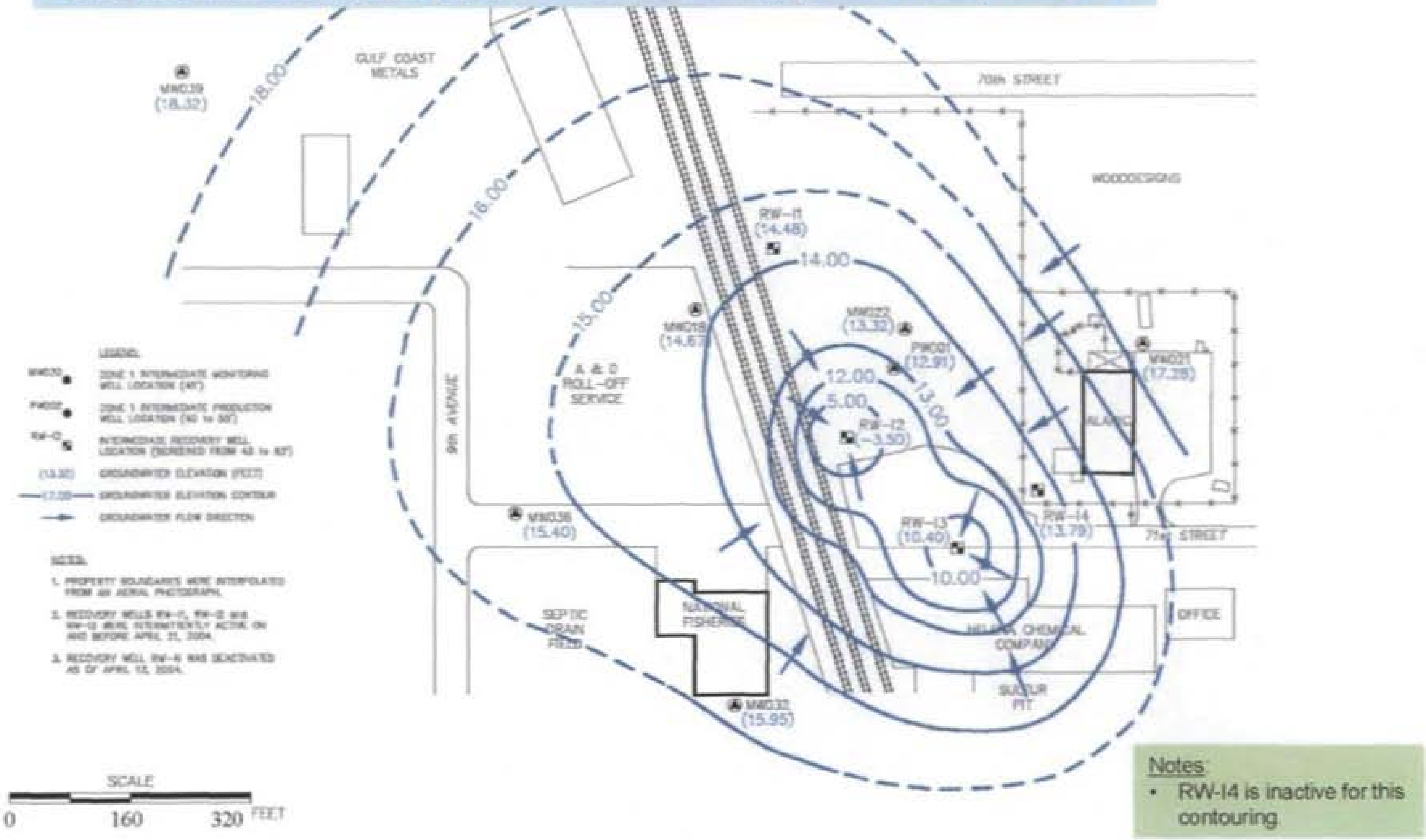


Figure 11

ATTACHMENT 2

Photos of Alaric Area Groundwater Plume Site

Photo #1. East end of the former Alaric building, as seen from truck lot of Helena Chemical Corporation.

Photo #2. South and east sides of Alaric building. Addition at left is equipment room for Groundwater Recovery and Treatment (GRAT) system.

Photo #3. Source area under concrete pad has been excavated. Pipe stubs along fence were used to gravity feed sodium permanganate to laterals ~30 inches bls. during second ISCO treatment, and may be reused. Line of stubs continues into the building.

Photo #4. Old septic tank system was excavated as a likely source area. The new elevated drain field is seen beyond fence.

Photo #5. Excavation of septic system drain field in 2003.

Photo #6. Excavation of source area in 2003. Depth of excavation was limited by high water table in surficial aquifer.

Photo #7. Pipes, manifolds, and valves control delivery of groundwater delivery to equipment room for treatment. Other components from ISCO permanganate treatment system have been disconnected, but could be used again.

Photo #8. Equipment room and GRAT components. Activated carbon chambers for intermediate GRAT appear at left side.

Photo #9. Contaminated groundwater from surficial aquifer first passes through activated carbon chambers to remove most VOCs. Water then passes through tray air strippers at left, which pull remaining VOCs, primarily vinyl chloride, and discharge through exhaust stacks.

Photo #10. Small gray cylinders at left are bag filters which receive water exiting air strippers and capture particulates before water is returned to its source aquifer.

Photo #11. Injection well IW001 returns treated groundwater from intermediate treatment system to open hole in Floridan Aquifer at 300-440 ft. bls.

Photo #12. A recovery well in the surficial aquifer, screened from ~8 to 12 ft. bls. Sensors and controls allow for adjustment of flows to maximize contaminant recovery.

Photo #13. North side of former Alaric building, now Sweeping Corp. of America. Maintenance bays are at far (west) end, offices in middle, equipments storage on near end. Manholes in pavement locate GRAT components.

Photo #14. Active maintenance bays for SCA.

Photo #15. Equipment storage room at east end of SCA building. Concrete floor at far left corner (SE) was removed to install ISCO percolation components, and then replaced.

Photo #16. View from North 71st St., looking south into truck lot of Helena Chemical Co. Alaric site is at near right; plume has extended into Helena's vacant wooded lot on far right.

Photo #17. Plume of contaminated groundwater has migrated from Alaric property southwest on to adjacent vacant lot owned by Helena Chemical Co.

Photo #18. South end of the GRAT equipment building faces the vacant lot. Flush-mounted monitoring well is seen in foreground.

Photo #19. View of neighborhood from entry to Alaric site, looking north along North 71st Street.

Photo #20. View of North 70th Street, one block west of the site, looking south toward railroad tracks.

Photos #21. Representative view of the surrounding neighborhood.

Photo #22. Representative view of the surrounding neighborhood.

Photo #23. Tampa Bypass Canal, approximately one mile east of the Alaric site. US 301 is seen at the left.

Photo #24. Tampa Bypass Canal, looking west.

ATTACHMENT 3

Public Announcement of the Five-Year Review

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U.S. Environmental Protection Agency – Region 4 Announces A Five Year Review for the Alaric Area Groundwater Plume Superfund Site

Purpose/Objective: Pursuant to Section 121 of CERCLA, as amended by SARA, the United States Environmental Protection Agency (EPA) is conducting a Five-Year Review for the Alaric Area Groundwater Plume Site. The objective of the review is to ensure that the selected remedy continues to protect human health and the environment.

Site Background: The Alaric Superfund Site (the Site) is located at 2110 North 71st Street, Tampa, Florida. The Site is located in a mixed residential, commercial, and industrial area east of Tampa known as Orient Park. The Site has been occupied by several businesses since the early 1970s. Operations of one of the tenants, Concrete Equipment Supply are believed to have caused the release of significant quantities of degreasers, including perchloroethylene (PCE) and trichloroethylene (TCE).

EPA issued an Interim Action Record of Decision in July 2002. The remedy selected had three components: 1) removal of the shallow soil contamination and septic tank; 2) treatment of the deeper subsurface soils through chemical oxidation; and 3) containment of the surficial and intermediate aquifer groundwater by pumping and treating.

Cleanup Action: Removal of the shallow contaminated soil and septic tank was completed in May 2003. This work included the removal and off-site disposal of the existing 1,000-gallon tank and associated drainfield. Injection of the oxidant potassium permanganate lasted 12 months (September 2003 through October 2004). During this time, a total of 221,500 pounds of potassium permanganate were injected. Soil samples collected in mid-2006 showed that the contamination in the surficial source zone treatment area had been substantially eliminated, with limited exceptions. Since December 2006, efforts have been primarily directed at the remaining areas of contamination. The areas of the site that have been substantially affected via contact with potassium permanganate are essentially non-detect or have low levels of volatile organic contaminants (VOC). Hydraulic containment of the downgradient extent of dissolved VOC contamination is complete. Vertical containment is considered to a depth of 85 feet below land surface.

EPA suggests that interested citizens visit the local document repository for more information on the Site and associated cleanup actions.

Five-Year Review Schedule: To ensure that the selected remedy remains protective of human health and the environment, the five-year review process will begin July 2007. The Five-Year Review process includes review of data and information, inspection of the site and community interviews. These activities will assist in the determination of whether the selected remedy remains protective of human health and the environment. Completion of the five-year review process is expected in March 2008.

Contact Information: If you have any questions, comments and/or concerns about the five-year review, you may contact the following:

Galo Jackson,
Project Manager
404-562-8937
1-800-435-9234 (Toll Free)

L'Tonya Spencer,
Community Involvement Coordinator
404-562-8463
1-800-435-9234 (Toll Free)

U.S. EPA – Region 4 Mailing Address
Waste Division (Mailcode: 4WD-SRTSB)
61 Forsyth Street
Atlanta, Georgia 30303

Local Document Repository
78th Street Community Library
7625 Palm River Road
Tampa, Florida 33619

5706 7/18/07

The Tampa Tribune

Published Daily

Tampa, Hillsborough County, Florida

State of Florida }
County of Hillsborough SS.

Before the undersigned authority personally appeared J. Lantaigne, who on oath says that she is the Advertising Accounting Supervisor of The Tampa Tribune, a daily newspaper published at Tampa in Hillsborough County, Florida; that the attached copy

Legal Ads IN THE Tampa Tribune

In the matter of Legal Notices

was published in said newspaper in the issues of

07/18/2007

Affiant further says that the said The Tampa Tribune is a newspaper published at Tampa in said Hillsborough County, Florida, and that the said newspaper has heretofore been continuously published in said Hillsborough County, Florida, each day and has been entered as second class mail matter at the post office in Tampa, in said Hillsborough County, Florida ... one year next preceding the first publication of the attached copy of ... and affiant further says that she has neither paid nor promised any person, ... ant for publication in the said newspaper.

J. E. Lantaigne

...ubscribed by me this 18 day ...07

...n: ✓ or Produced Identification ___
...ation Produced ___

Ana Maria Hodel
Commission # DD551387
Expires: MAY 11, 2010

U.S. Environmental Protection Agency - Region 4
Announces A Five Year Review for the
Alaric Area Groundwater Plume Superfund Site

Purpose/Objective: Pursuant to Section 121 of CERCLA, as amended by SARA, the United States Environmental Protection Agency (EPA) is conducting a Five-Year Review of the Alaric Area Groundwater Plume Site. [illegible]

Site Background: [illegible]

[illegible]

Five-Year Review Schedule: [illegible]

Contact Information: If you have any questions, comments and/or concerns about the five-year review, you may contact the following:

Cole Jackson,	L'Tonya Spencer,
Project Manager	Community Involvement Coordinator
404-562-[illegible]	404-562-[illegible]
1-800-435-9234 (Toll Free)	1-800-435-9234 (Toll Free)
U.S. EPA - Region 4 Mailing Address	**Local Document Repository**
Waste Division [illegible]	78th Street Community Library
61 Forsyth Street	7625 Palm River Road
Atlanta, Georgia 30303	Tampa, Florida 33619

5726

Order # C002181400 1022863 – EPA REGION 4

ATTACHMENT 4

Five-Year Review Site Inspection Checklist

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: ALARIC GW PLUME	Date of inspection: 7-18-07
Location and Region: TAMPA, FL - R4	EPA ID: FLD 012978862
Agency, office, or company leading the five-year review: USACE-JACKSONVILLE	Weather/temperature: SUNNY / UPPER 80s

Remedy Includes: (Check all that apply)

- G Landfill cover/containment
- G Access controls
- G Institutional controls
- X Groundwater pump and treatment
- G Surface water collection and treatment
- G Other SOURCE REMOVAL
- G Monitored natural attenuation
- X Groundwater containment
- G Vertical barrier walls

Attachments: G Inspection team roster attached G Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** CAL BUTLER / PROJ. MGR / 7-18-07
   Name / Title / Date
   Interviewed X at site G at office G by phone Phone no. ______
   Problems, suggestions; G Report attached ______

2. **O&M staff** ______ / ______ / ______
   Name / Title / Date
   Interviewed G at site G at office G by phone Phone no. ______
   Problems, suggestions; G Report attached ______

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency FDEP
Contact NANCY MURCHISON | PROJ MGR | 7-18-07 | 850-245-8990
Name | Title | Date | Phone no.
Problems; suggestions; G Report attached

Agency
Contact
Name | Title | Date | Phone no.
Problems; suggestions; G Report attached

Agency
Contact
Name | Title | Date | Phone no.
Problems; suggestions; G Report attached

Agency
Contact
Name | Title | Date | Phone no.
Problems; suggestions; G Report attached

4. **Other interviews** (optional) G Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)			
1. **O&M Documents**			
G O&M manual	G Readily available	G Up to date	G N/A
G As-built drawings	G Readily available	G Up to date	G N/A
G Maintenance logs	G Readily available	G Up to date	G N/A
Remarks			
2. **Site-Specific Health and Safety Plan**	G Readily available	G Up to date	G N/A
G Contingency plan/emergency response plan	G Readily available	G Up to date	G N/A
Remarks			
3. **O&M and OSHA Training Records**	G Readily available	G Up to date	G N/A
Remarks			
4. **Permits and Service Agreements**			
G Air discharge permit	G Readily available	G Up to date	G N/A
G Effluent discharge	G Readily available	G Up to date	G N/A
G Waste disposal, POTW	G Readily available	G Up to date	G N/A
G Other permits	G Readily available	G Up to date	G N/A
Remarks NO FORMAL PERMITS			
5. **Gas Generation Records**	G Readily available	G Up to date	G N/A
Remarks EPA - ATHENS LAB PLACED MONIT. CANISTERS FOR ~3 DAYS AT FENCE LINE & PRIVATE RESIDENCE			
6. **Settlement Monument Records**	G Readily available	G Up to date	X N/A
Remarks			
7. **Groundwater Monitoring Records**	X Readily available	X Up to date	G N/A
Remarks			
8. **Leachate Extraction Records**	G Readily available	G Up to date	X N/A
Remarks			
9. **Discharge Compliance Records**			
G Air	G Readily available	G Up to date	X N/A
X Water (effluent)	G Readily available	G Up to date	G N/A
Remarks AUTOMATED FLOW RECORDING FOR ALL SYSTEMS, ON-LINE, ALLOWS FOR REMOTE CONTROL & ALARM RESPONSE			
10. **Daily Access/Security Logs**	G Readily available	G Up to date	G N/A
Remarks VISITOR SIGN-IN & MANDATORY SAFETY ORIENTATION. SIGN IN LOG FOR ALL PERSONNEL IN OCT 07.			

IV. O&M COSTS

1. **O&M Organization**
   - G State in-house
   - G Contractor for State
   - G PRP in-house
   - G Contractor for PRP
   - G Federal Facility in-house
   - G Contractor for Federal Facility
   - X Other CONTRACTOR FOR EPA FUND-LEAD SITE

2. **O&M Cost Records**
   - G Readily available
   - G Up to date
   - X Funding mechanism/agreement in place

   Original O&M cost estimate $212,542/YR FOR GRAT ONLY G Breakdown ~~attached~~ → NOT AVAILABLE IN ROD

   Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			G Breakdown attached
			G Breakdown attached
			G Breakdown attached
			G Breakdown attached
			G Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

   Describe costs and reasons:

V. ACCESS AND INSTITUTIONAL CONTROLS G Applicable G N/A

A. Fencing

1. **Fencing ~~damaged~~** G Location shown on site map X Gates secured G N/A

   Remarks GOOD CONDITION

B. Other Access Restrictions

1. **Signs and other security measures** G Location shown on site map G N/A

   Remarks SEE PHOTOS. DOORS TO CONTROL ROOM & TREATMENT AREA ARE ALARMED TO SECURITY SERVICE.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented G Yes G No X N/A
Site conditions imply ICs not being fully enforced G Yes G No X N/A

Type of monitoring (*e.g.*, self-reporting, drive by) ______
Frequency ______
Responsible party/agency ______
Contact ______ Name ______ Title ______ Date ______ Phone no.

Reporting is up-to-date G Yes G No G N/A
Reports are verified by the lead agency G Yes G No G N/A

Specific requirements in deed or decision documents have been met G Yes G No X N/A
Violations have been reported G Yes G No X N/A
Other problems or suggestions: G Report attached
NO ICs WERE SPECIFIED IN THE INTERIM-ACTION ROD.

2. **Adequacy** G ICs are adequate G ICs are inadequate X N/A
Remarks ______

D. General

1. **Vandalism/trespassing** G Location shown on site map X No vandalism evident
Remarks ______

2. **Land use changes on site** X N/A
Remarks ______

3. **Land use changes off site** X N/A
Remarks ______

VI. GENERAL SITE CONDITIONS

A. Roads G Applicable X N/A

1. **Roads damaged** G Location shown on site map G Roads adequate G N/A
Remarks ______

B. Other Site Conditions

Remarks ADEQUATE - NO ADVERSE COMMENTS.

VII. LANDFILL COVERS G Applicable X N/A

A. Landfill Surface

1. **Settlement** (Low spots) G Location shown on site map G Settlement not evident
   Areal extent________ Depth________
   Remarks________

2. **Cracks** G Location shown on site map G Cracking not evident
   Lengths________ Widths________ Depths________
   Remarks________

3. **Erosion** G Location shown on site map G Erosion not evident
   Areal extent________ Depth________
   Remarks________

4. **Holes** G Location shown on site map G Holes not evident
   Areal extent________ Depth________
   Remarks________

5. **Vegetative Cover** G Grass G Cover properly established G No signs of stress
   G Trees/Shrubs *(indicate size and locations on a diagram)*
   Remarks________

6. **Alternative Cover (armored rock, concrete, etc.)** G N/A
   Remarks________

7. **Bulges** G Location shown on site map G Bulges not evident
   Areal extent________ Height________
   Remarks________

IX. GROUNDWATER/SURFACE WATER REMEDIES X Applicable G N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines X Applicable G N/A	
1.	**Pumps, Wellhead Plumbing, and Electrical** X Good condition G All required wells properly operating G Needs Maintenance G N/A Remarks
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** X Good condition G Needs Maintenance Remarks
3.	**Spare Parts and Equipment** X Readily available G Good condition G Requires upgrade G Needs to be provided Remarks
B. Surface Water Collection Structures, Pumps, and Pipelines G Applicable X N/A	
1.	**Collection Structures, Pumps, and Electrical** G Good condition G Needs Maintenance Remarks
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** G Good condition G Needs Maintenance Remarks
3.	**Spare Parts and Equipment** G Readily available G Good condition G Requires upgrade G Needs to be provided Remarks

C. Treatment System X Applicable G N/A

1. **Treatment Train** (Check components that apply)
G Metals removal G Oil/water separation G Bioremediation
X Air stripping X Carbon adsorbers
G Filters BAG FILTERS CAPTURE SOLIDS IN EXHAUST GAS
G Additive (*e.g.*, chelation agent, flocculent)
G Others
X Good condition G Needs Maintenance
G Sampling ports properly marked ~~and functional~~ – NOT CURRENT
G Sampling/maintenance log displayed and up to date
G Equipment properly identified – NOT CURRENT
G Quantity of groundwater treated annually ON FILE
G Quantity of surface water treated annually N/A
Remarks

2. **Electrical Enclosures and Panels** (properly rated and functional)
G N/A X Good condition G Needs Maintenance
Remarks

3. **Tanks, Vaults, Storage Vessels**
G N/A X Good condition X Proper secondary containment G Needs Maintenance
Remarks

4. **Discharge Structure and Appurtenances**
G N/A X Good condition G Needs Maintenance
Remarks

5. **Treatment Building(s)**
G N/A X Good condition (esp. roof and doorways) G Needs repair
X Chemicals and equipment properly stored
Remarks

6. **Monitoring Wells** (~~pump and~~ treatment remedy)
X Properly secured/locked G Functioning X Routinely sampled X Good condition
G All required wells located G Needs Maintenance G N/A
Remarks 1 EXCEPTION FOUND

D. Monitoring Data

1. Monitoring Data
X Is routinely submitted on time X Is of acceptable quality

2. Monitoring data suggests:
G Groundwater plume is effectively contained G Contaminant concentrations are declining

D. Monitored Natural Attenuation — N/A

1. **Monitoring Wells** (natural attenuation remedy)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G All required wells located G Needs Maintenance X N/A
Remarks

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

DURING ON-GOING PUMP & TREAT, SYSTEM IS REMOTELY MONITORED. TECH IS SCHED. TO VISIT SITE 2-3 TIMES/WK TO CHANGE BAG FILTERS, OTHER ACTIONS A/R OR IN RESPONSE TO ALARM CONDITIONS.

* FOR TREAT'MT OF GW FROM INTERMED. AQUIFER, AIR STRIPPER WAS ADDED TO TREAT. TRAIN IN RESPONSE TO MINOR EXCEEDANCE OF VINYL CHLORIDE IN RETURN WATER.

* FOR TREATM'T OF GW FROM SURFICIAL AQF, AIR STRIPPER TO FRONT OF TREATM'T TRAIN IN RESPONSE TO BIO-FOULING.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. PERIODIC MAINT. IS REQ'D TO ADDRESS MINERAL FOULING ON DEEP WELL INJECT. SYSTEM FOR RETURN OF TREATED WATER TO INTERMED. AQUIFER. CONTRACTOR IS EXPERIENCING BIO-FOULING IN TREAT. SYST. FOR WATER FROM SURFICIAL AQF. ANALYSIS IS BEING DONE, AND ADJUSTMENTS MADE.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

ATTACHMENT 5

EPA Five-Year Review Questionnaire

U.S. Environmental Protection Agency
Alaric, Inc. Superfund Site
2007 Five-Year Review Questionnaire
July 18, 2007

Resident/Company Name: ______________________________

Do you know anything about the Alaric Site? If yes, what do you know?

Has the Alaric site affected you or your business in anyway? If yes, how have you been affected?

Have you received information from the U.S. Environmental Protection Agency?

Yes __________ No __________

If not, would you like to receive information concerning the Alaric site?

Name: ______________________________

Address: ______________________________

City: ______________ State: __________ Zip: ________

Phone: ______________

Do you have any comments, questions or concerns about the Alaric site?

EPA United States of America
Environmental Protection Agency

A FAX FROM:

TO: [redacted]	FAX NO.:

SUBJECT: Alaric - Completed Community Interview Forms

FROM: [redacted]	PHONE NO.: [redacted]
OFFICE: [redacted]	FAX NO. FOR: [redacted]

COMMENTS:

[redacted]

[redacted]

[redacted]

DATE and TIME: 3/10/08 4:10 pm	NO. of PAGES: 6

EPA Form 1315-18 (Rev. 5/97) (WebForms v1.0)

U.S. Environmental Protection Agency
Alaric Inc. Superfund Site
2007 5 Year Review Questionnaire
July 18, 2007

Resident/Company Name: [redacted]

Do you know anything about the Alaric Site? If yes, what do you know? [redacted]

No, Was not aware

Has the Alaric site affected you or your business in any way? If yes, how have you been affected? (Day-to-day operations)

Concerns about air quality
Work outside everyday.

Have you received information from the U.S. Environmental Protection Agency?
Yes / No

If not, would you like to receive information concerning the Alaric site?

Name: Andy Klodakis - 7200 E. Broadwy (brz)

Address: [redacted]

City: Tampa State: FL Zip [redacted]

[redacted]

Do you have any comments, questions or concerns about the Alaric site?

What's in the air?
Is anything hazardous, let them know.
There are lots of smells in the air.
Not every day, but hasn't been there

U.S. Environmental Protection Agency
Alaric Inc. Superfund Site
2007 5 Year Review Questionnaire
July 18, 2007

Resident/Company Name: [redacted]

Do you know anything about the Alaric Site? If yes, what do you know?

Rezoning Now RS-50 to IG

[redacted]

Homes have been bought out by the Battery Plant

Office/Warehouse

One day there's trailers then the next the battery plant.

Has the Alaric site affected you or your business in any way? If yes, how have you been affected? (Day-to-day operations)

Yes, knows the sites there, but it doesn't bother them @ all

Just Built Habitat Homes (2)

Have you received information from the U.S. Environmental Protection Agency?
~~Yes / No~~

Doesn't want any.

If not, would you like to receive information concerning the Alaric site?

Name: [redacted]

Address: [redacted]

City: Tampa State: FL Zip:

Do you have any comments, questions or concerns about the Alaric site?

None. Only concern is the Battery Plant

U.S. Environmental Protection Agency
Alaric Inc. Superfund Site
2007 5 Year Review Questionnaire
July 18, 2007

Resident/Company Name: [redacted]

Do you know anything about the Alaric Site? If yes, what do you know?

Not really, just the others (Helena, Stauffer)

Has the Alaric site affected you or your business in any way? If yes, how have you been affected? (Day-to-day operations) Nope.

No concerns

Have you received information from the U.S. Environmental Protection Agency?
Yes No

If not, would you like to receive information concerning the Alaric site?

Name: [redacted]

Address: [redacted]

City: _Tampa_________ State: FL Zip: [redacted]

Do you have any comments, questions or concerns about the Alaric site?

None.

U.S. Environmental Protection Agency
Alaric Inc. Superfund Site
2007 5 Year Review Questionnaire
July 18, 2007

Resident/Company Name: [redacted]

Do you know anything about the Alaric Site? If yes, what do you know?

Nope. Just moved in 3yrs Ago.

Has the Alaric site affected you or your business in any way? If yes, how have you been affected? (Day-to-day operations)

No - Didn't Know any sites existed.

Have you received information from the U.S. Environmental Protection Agency?
Yes / No

If not, would you like to receive information concerning the Alaric site?

Name: [redacted]

Address: [redacted]

City: _Tampa__________ State: FL Zip: [redacted]

Do you have any comments, questions or concerns about the Alaric site?

Are there any cases of cancer related to the site?

U.S. Environmental Protection Agency
Alaric Inc. Superfund Site
2007 5 Year Review Questionnaire
July 18, 2007

Resident/Company Name: [redacted]

Do you know anything about the Alaric Site? If yes, what do you know?

No.

Has the Alaric site affected you or your business in any way? If yes, how have you been affected? (Day-to-day operations) No.

Have you received information from the U.S. Environmental Protection Agency?
Yes / No

If not, would you like to receive information concerning the Alaric site?

Name: [redacted]

Address: [redacted]

City: _Tampa__________ State: FL Zip:____________

Do you have any comments, questions or concerns about the Alaric site?

None. Nothing's bothering her.

ATTACHMENT 6

Alaric Monthly Operating Report

Shaw® Shaw Environmental & Infrastructure, Inc.

A World of Solutions™

October 23, 2007

Mr. Matthew Ellender
Project Manager
USACE RPD
2995 Branson Court East
Mobile, Alabama 36695

Re: Monthly Operating Report: September 16 through October 15, 2007
Groundwater Recovery & Treatment (GR&T) Systems
Alaric Superfund Site, Tampa, Florida
Contract DACA45-98-D-022, Task 28

Dear Mr. Ellender:

Shaw Environmental, Inc. (Shaw) is pleased to present this monthly operating report for the above referenced project. The report has been prepared to summarize the interim action activities performed at the site from the operation, maintenance, and monitoring (OM&M) of the Shallow and Intermediate GR&T systems.

<u>**Operating Activities**</u>

Both the Shallow and Intermediate GR&T Systems were operated during the report period. A summary of system operations, which include run times, flow rates, volumes of groundwater recovered and treated, masses of target volatile organic compounds (VOCs) recovered, and air stripper emission rates, is presented in Table 1.

Groundwater was recovered from the Shallow GR&T System at an average flow rate of 4.48 gallons per minute (gpm). The Central Recovery Trench and the Northwest Recovery Well points were operated to recover groundwater. All of the recovered groundwater was treated before being injected on site via the West Exfiltration Gallery.

Groundwater was recovered from recovery wells RW-I1, RW-I2, and RW-I3 in the Intermediate System for a total combined influent flow rate of 7.28 gpm. Recovery well RW-I4 was not operated. The treated water from the Intermediate GR&T System was injected on site via Deep Injection Well IW-001.

Maintenance activities and unscheduled shutdowns resulted in reduced runtimes of 78.3 percent for the Shallow System and 81.3 percent for the Intermediate System.

The groundwater treatment configuration of both systems included liquid-phase carbon adsorption followed by air stripping. However, the Shallow System had particle filtration prior to carbon adsorption while the Intermediate System had particle filtration subsequent to air stripping.

Attachment A provides operations logs, which include the times of operation and shutdown occurrences and causes for both systems.

Estimated Target VOCs Recovered and Emitted by Air Stripping: Water samples collected at the influent to both systems were used to estimate the pounds of contaminant recovered with the groundwater. Water samples collected at the influent and effluent of the air strippers from both systems were used to estimate the pounds of contaminant discharged to the atmosphere. All estimated quantities were based on grab samples. Calculations are presented in Attachment B.

An estimated 0.91 pounds of target VOCs were recovered from the subsurface from the Shallow System for this report period. An estimated 7.9 pounds of target VOCs were recovered from the subsurface from the Intermediate System for this report period.

Estimated target VOC emission rates from the untreated air stripper exhausts were less than 0.000275 pound per day for the Shallow System and less than 0.000076 pound per day for the Intermediate System.

Unscheduled Shutdown Events

Shallow GR&T System: The following unscheduled shutdown events occurred on the Shallow GR&T System during the report period:

- The system shutdown on October 1, 2007, due to high level alarm in the air stripper sump. The high level shutdown was believed to be caused by a siphon problem during the pump cycle (P6). An existing anti-siphon valve was replaced to correct this problem.
- The system shutdown on October 13, 2007, due to an unknown alarm condition. Several days prior to the shutdown, low flow sump pump flow alarms (P6_FAL) and eductor transfer pump failure (P5_FAIL) alarms occurred. Evaluation and correction of this condition is currently being performed.

Intermediate GR&T System: The following unscheduled shutdown event occurred on the Intermediate GR&T System during the report period:

- The system shutdown on September 25, 2007, and October 1, 2007 due to a high water level in the air stripper sump (TS2-LAH), which was caused by restricted flow through the downstream bag filter (F3) that was plugging. The spent filter bags were replaced.
- The system also shutdown on October 13, 2007 due to a high water level in the air stripper sump (TS2-LAH). However, this alarm is believed to be caused by buildup of hardness scale in either the effluent pump (P12) or the deep injection well IW-I4. This determination is based on high pressure gauge readings at the

influent of the deep injection well (IW-I4) as well as high pressure alarms at upstream system components (bag filters and air stripper sump pump). Evaluation and correction of this condition is currently being performed.
- The system remains stopped until the high pressure condition is corrected.

Maintenance Activities

Shallow GR&T System: The following tasks were performed:

- Replaced filter bags in bag filter housings (F-2).
- Installed new valves, pipe fittings, and pressure gauges at the carbon filters for backwashing maintenance purposes.
- Performed inspection of each shallow recovery well in the Central and Northeast Recovery Trenches to document depth to water table, recovery flow rate, and condition of eductor, foot valve, check valve, and ball control valve. The valves and eductors were cleaned as necessary.

Intermediate GR&T System: The following tasks were performed:

- Replaced filter bags in bag filter housings (F-2).
- Installed new valves, pipe fittings, and pressure gauges at the carbon filters for backwashing maintenance purposes.
- Readjusted the K factor settings on the newly installed flow meter at RW-I3.

Programmable Logic Controls (PLC)/RSView® Human-Machine Interface (HMI): Work was not performed on the PLC or HMI during the report period.

Monitoring Activities

Monthly Process Sampling: Attachment C presents a summary of the analytical results for the monthly process sampling activities performed during system operation activities. Water samples were collected from both systems on October 9, 2007. Each sample was analyzed for the target VOCs using USEPA Method 8260B. Charting of the target VOC influent concentrations over time are provided for each groundwater treatment system in Attachment D. An increasing trend of the target VOC influent concentrations was observed, especially in the Shallow system. This may be attributed to reconfiguration of the groundwater recovery scheme which is presently recovering from the Central Recovery Trench and the Northwest Recovery Well points.

Results of the process sampling activities indicated that the target VOC concentrations in the treated water were below the FDEP Groundwater Cleanup Target Levels prior to subsurface discharge from both treatment systems.

Sampling results for the Shallow System indicate that vinyl chloride (VC), cis-1,2-dichloroethene (cis-1,2-DCE), trichloroethene (TCE), and tetrachloroethene (PCE) are all above their FDEP Target Levels in the influent to lead carbon filter GAC-2. All but VC is removed to below its FDEP Target Level (1 ug/L) through the carbon filters. Upon passage through air stripper AS-1, VC is reduced to below 0.12 ug/L (method detection limit, MDL).

Similarly, sampling results for the Intermediate System indicate that VC, cis-1,2-DCE, TCE, and PCE are all above their FDEP Target Levels in the influent to lead carbon filter GAC-4. Upon passage through lag carbon filter GAC-3, VC, cis-1,2-DCE, TCE, and PCE are removed to below their FDEP Target Levels.

Lead carbon filters GAC-2 and GAC-4 appear to be spent for VC, but the VC is being removed to less than 0.12 ug/L (MDL) through lag carbon filters GAC-1 and GAC-5, respectively. Although apparently spent for VC, GAC-2 and GAC-4 are still effective (greater than 95 percent) in removing the other compounds.

Groundwater Monitoring and Sampling: Groundwater samples were collected from the Central Recovery Trench (Port 2), the Northwest Recovery Trench (Port 4) and the Combined Influent (Port 5) of the Shallow system to evaluate the presence of *Escherichia* Coli (*E.* coli) from a nearby septic drain field.

The laboratory results were compared to the US EPA Final Water Quality Standards for Coastal and Great Lakes Recreational Waters (i.e., BEACH Act of 2000). The BEACH Act defines coastal recreational waters as the Great Lakes and marine coastal waters (including coastal estuaries) that states, territories, and tribes designate in their water quality standards for use in swimming, bathing, surfing, or similar water contact activities. The USEPA has set the level of *E. coli* in freshwater at 126 most probable number (MPN) per 100 mL. As indicated in the laboratory report, the results for Ports 2, 4, and 5 were 3.0, 2.0, and 1.0 MPN/100 mL, respectively, which are all less than 126 MPN/100 mL.

In addition, samples were also collected from the Central Recovery Trench (Port 2), the Northwest Recovery Trench (Port 4) and the effluent of the Eductor tank (T4) to evaluate biological activity as iron reducing bacteria, sulfate reducing bacteria, and slime forming bacteria. Results of the biological activity screening were not available at the completion time of this report and will be reported at a later date.

Laboratory Analytical Reports

Attachment E presents the laboratory analytical report for the *Escherichia* Coli (*E.* coli) sampling activities. Attachment F provides the laboratory analytical reports and Shaw's Data Usability Reports for the monthly process samples for the report period.

Work Beginning October 16, 2007

The following activities are planned for the report period beginning October 16, 2007:

- Determine cause of high pressure at the deep injection well IW-I4 and correct if feasible.
- Continued OM&M of the Shallow and Intermediate GR&T Systems.
- Conduct process monitoring and sampling of the Shallow and Intermediate GR&T Systems.
- Evaluate water sample results collected at the influent and effluent of the eductor tank (T-4) of the Shallow system for screening of biological activity.
- Prepare and submit the monthly OM&M report.

Outstanding Items

The following reports and proposals have been submitted to the USEPA and USACE for review, comment, and direction.

- Technical Proposal, Air Emission ("zero emissions") Modifications to the GR&T Systems, dated June 29, 2007.
- Optimization Report – Fouling Issues, dated July 24, 2007.
- Phase II Interim Action Completion Report, Permanganate Injection, dated August 21, 2007.

Please call me, at 419-425-6304, or Mr. John Nenni, at 419-425-6288, if you have any questions.

Sincerely,

Christopher P. Strzempka, P.G.
Geologist

cps:CPS

Attachments

pc: Galo Jackson, USEPA
Mike Schultz, USACE JAX
Frank Zepka, USACE JAX
John Nenni, Shaw
Eric Haydu, Shaw
Cal Butler, Shaw

Table 1

Summary of Operations
Report Period: September 16, 2007, through October 15, 2007

Alaric Superfund Site, Tampa, Florida
Contract DACA45-98-D-022, Task 28

Operating Parameter	Shallow System	Intermediate System
Total Hours in Report Period	632.5	632.5
Hours of Operation	495.1	514.1
Percent Runtime	78.3	81.3
Total Gallons Recovered	133,150	224,637
Average Recovery Rate (gal/min)	4.48	7.28
Cumulative Gallons Recovered and Treated	12,937,226	(A)
Mass Recovered (lbs) (B)	0.91	7.9
Air Stripper Emission Rate (lbs/day) (B)	<0.000275	<0.000076

(A) The RW-I3 totalizer meter failed during the May 2007 report period. A program logging error prevented data collection from some of the totalizer meters during system operation. The meter was replaced and the cumulative gallons will be calculated in the future.
(B) Represents the target VOCs: Tetrachloroethene; Trichloroethene; cis-1,2-Dichloroethene; trans-1,2-Dichloroethene; 1,1-Dichloroethene; and Vinyl Chloride.

Attachment A

Operations Log

Shallow Groundwater Recovery and Treatment System
Report Period: September 16, 2007, through October 15, 2007

DATE	TIME	SYSTEM STATUS	ALARM	SSN_FQI	SS_KQI	NOTE
				(gallons)	(hours)	
9/16/2007	0:00	Start of Report Period		16660.93	0.0	Stopped per USEPA request to perform stack dispersion modeling.
9/19/2007	15:30	Groundwater recovery started		16660.93	0.0	
9/20/2007		Groundwater recovery		--		
9/21/2007		Groundwater recovery		--		
9/22/2007		Groundwater recovery		--		
9/23/2007		Groundwater recovery		--		
9/24/2007		Groundwater recovery		--		
9/25/2007		Groundwater recovery		--		
9/26/2007		Groundwater recovery		--		
9/26/2007		Maintenance visit		--		
9/27/2007		Groundwater recovery		--		
9/28/2007		Groundwater recovery		--		
9/29/2007		Groundwater recovery		--		
9/30/2007		Groundwater recovery		--		
10/1/2007	11:52	Groundwater recovery stopped	B1_LAH	--		Air stripper blower sump high level alarm (caused by pump P6 failure)
10/1/2007	16:08	Groundwater recovery started		--		
10/1/2007	16:23	Groundwater recovery stopped	B1_LAH	--		Air stripper blower sump high level alarm (caused by pump P6 failure)
10/1/2007		Maintenance visit		--		
10/2/2007	16:04	Groundwater recovery started		--		
10/2/2007		Maintenance visit		--		
10/3/2007		Groundwater recovery		--		
10/3/2007		Maintenance visit		--		
10/4/2007		Groundwater recovery		--		
10/5/2007		Groundwater recovery		--		
10/6/2007		Groundwater recovery		--		
10/7/2007		Groundwater recovery		--		
10/8/2007	14:04	Groundwater recovery	P6_FAL	--		Pump P6 low flow alarm
10/8/2007		Maintenance visit		--		
10/8/2007	15:00	Groundwater recovery	P5_FAIL	--		Eductor tank pump failure
10/9/2007		Maintenance visit		--		Periodic starts and stops to determine P6_FAL and P5_FAIL alarms
10/10/2007		Groundwater recovery		--		
10/11/2007		Maintenance visit		--		Periodic starts and stops
10/12/2007		Groundwater recovery		--		
10/13/2007	8:07	Groundwater recovery stopped	SYS_SD	149811.13	495.1	Unknown cause of shutdown.
10/14/2007		Groundwater recovery stopped				
10/15/2007		Maintenance visit				System not restarted. Troubleshooting ongoing.
10/15/2007	24:00:00	End of Report period		149811.13	495.1	

NOTES:

SSN_FQI = Eductor tank (P5) pump effluent totalizer meter reading from FIT722 (adjusted).
SS_KQI = Shallow System cumulative hour meter runtime.

TOTALS	
29706	minutes
133150.2	gallons
4.48	gallons per minute
37950	minutes in report period
78.3	percent run time

Intermediate Groundwater Recovery and Treatment System
Report Period: September 16, 2007, through October 15, 2007

DATE	TIME	SYSTEM STATUS	ALARM	IS_FQI[(A)]	IS_KQI	NOTE
				(gallons)	(hours)	
9/16/2007	0:00	Start of report period		63026.9	0.0	Stopped per USEPA request to perform stack dispersion modeling.
9/19/2007	15:30	*Groundwater recovery started*		63026.9	0.0	
9/20/2007		Groundwater recovery		--		
9/21/2007		Groundwater recovery		--		
9/22/2007		Groundwater recovery		--		
9/23/2007		Groundwater recovery		--		
9/24/2007		Groundwater recovery		--		
9/25/2007	15:44	Groundwater recovery stopped	TS2_LAH	--		Level alarm high in air stripper
9/26/2007		Maintenance visit		--		
9/26/2007	15:30	Groundwater recovery started		--		
9/27/2007		Groundwater recovery		--		
9/28/2007		Groundwater recovery		--		
9/29/2007		Groundwater recovery		--		
9/30/2007		Groundwater recovery		--		
10/1/2007	11:52	Groundwater recovery stopped	TS2_LAH	--		Level alarm high in air stripper
10/1/2007		Maintenance visit		--		
10/1/2007	16:08	Groundwater recovery started		--		
10/2/2007		Maintenance visit		--		
10/3/2007		Maintenance visit		--		
10/3/2007	9:07	Groundwater recovery	F3_DPAH	--		Differential pressure high alarm in bag filters
10/3/2007	14:10	Groundwater recovery	P11_PAH	--		Transfer pump high discharge pressure alarm
10/4/2007	13:25	Groundwater recovery	F3_DPAH	--		*Differential pressure high alarm in bag filters*
10/5/2007		Groundwater recovery		--		
10/6/2007		Groundwater recovery		--		
10/8/2007		Groundwater recovery		--		
10/8/2007	14:31	Groundwater recovery	F3_DPAH	--		Differential pressure high alarm in bag filters
10/8/2007		Maintenance visit		--		
10/9/2007		Maintenance visit		--		
10/9/2007	8:25	Groundwater recovery	F3_DPAH	--		Differential pressure high alarm in bag filters
10/10/2007	2:57	Groundwater recovery	F3_DPAH	--		Differential pressure high alarm in bag filters
10/10/2007	10:54	Groundwater recovery	P11_PAH	--		Transfer pump high discharge pressure alarm
10/11/2007		Maintenance visit		--		Periodic starts and stops
10/12/2007		Groundwater recovery		--		
10/13/2007	8:07	Groundwater recovery stopped	TS2_LAH	287664.3	514.1	High pressure in deep injection well IW-I4
10/14/2007		Groundwater recovery stopped				
10/15/2007		Maintenance visit		--		System not restarted. Troubleshooting ongoing.
10/15/2007	24:00:00	End of Report period		287664.3	514.1	

NOTES:

(A) = As determined by FIT-500 and indicated by IS_FQI
IS_FQI = Recovery well totalizer reading determined from FIT504, FIT524, and FIT534.
IS_KQI = Intermediate System cumulative hour meter runtime.

TOTALS	
30846	minutes
224637.4	gallons
7.28	gpm
37950	minutes in report period
81.3	percent run time

Attachment B

Calculations

Mass Recovered with Shallow Groundwater

Alaric Superfund Site, Tampa, Florida
Contract DACA45-98-D-022, Task 28

Shallow Groundwater Treatment System				
Sample Date	Compound	Combined Influent (ug/L)	Total Gallons Recovered	Mass Recovered (lbs)
NOTES		A	B	C
10/09/07	Tetrachloroethene	380	133,150	0.4220
	Trichloroethene	200	133,150	0.2221
	cis-1,2-Dichloroethene	230	133,150	0.2554
	trans-1,2-Dichloroethene	2	133,150	0.0022
	1,1-Dichloroethene	1.6	133,150	0.0018
	Vinyl Chloride	4.2	133,150	0.0047
			TOTAL:	**0.91**

NOTES

A Lab Code J0704831-003

B Total gallons recorded for the reporting period: September 16, 2007 (0000 hr) through October 15, 2007 (2400 hr).

C See Sample Calculation.

Sample Calculation for Vinyl Chloride (VC)

Mass Recovered (lbs)

[(4.2) lb VC / (1 x 10^9) lb H_2O] x (8.34) lb H_2O/gal H_2O x (133 150) gal H_2O = 0.0047 lb VC

Air Emissions from Air Stripper AS-1

Alaric Superfund Site, Tampa, Florida
Contract DACA45-98-D-022, Task 28

Shallow Groundwater Treatment System								
Sample Date	Compound		AS-1 Influent (ug/L)		AS-1 Effluent (ug/L)	Influent - Effluent (ug/L)	Average Rate (gal/min)		Air Stripper Emission Rate (lb/day)
NOTES			A, C		B		D		C, D, E
10/09/07	Tetrachloroethene	i	0.82	<	0.16	0.66	4.48	<	0.000044
	Trichloroethene	<	0.20	<	0.20	0.00	4.48	<	0.000011
	cis-1,2-Dichloroethene	<	0.12	<	0.12	0.00	4.48	<	0.000006
	trans-1,2-Dichloroethene	<	0.11	<	0.11	0.00	4.48	<	0.000006
	1,1-Dichloroethene	<	0.16	<	0.16	0.00	4.48	<	0.000009
	Vinyl Chloride		3.70	<	0.12	3.58	4.48	<	0.000199
							TOTAL:	**<**	**0.000275**

NOTES

- A Lab Code J0704831-006
- B Lab Code J0704831-007
- C Assumed 100% removal of compounds from groundwater via air stripping.
- D See Sample Calculations.
- E The FDEP maximum allowable emission limit for hazardous air pollutants (HAPs) from a remediation site is 13.7 lb/day.

Sample Calculations

Average Treatment Rate = Total Gallons Recovered over Hours of Operation
(133 150) gal H_2O / (29 706) min = 4.48 gal/min

Air Stripper Emission Rate (lb/day) for Vinyl Chloride (VC)
[(3.7) lb VC / (1 x 10^9) lb H_2O] x (8.34) lb H_2O/gal H_2O x (4.48) gal H_2O/min x (1 440) min/day = 0.000199 lb VC/day

Mass Recovered with Intermediate Groundwater

Alaric Superfund Site, Tampa, Florida
Contract DACA45-98-D-022, Task 28

Intermediate Groundwater Treatment System				
Sample Date	Compound	GAC 4 Influent (ug/L)	Total Gallons Recovered	Mass Recovered (lbs)
NOTES		A	B	C
10/09/07	Tetrachloroethene	1,900	224,637	3.5596
	Trichloroethene	2,000	224,637	3.7469
	cis-1,2-Dichloroethene	290	224,637	0.5433
	trans-1,2-Dichloroethene	25	224,637	0.0468
	1,1-Dichloroethene	3.1	224,637	0.0058
	Vinyl Chloride	3.7	224,637	0.0069
			TOTAL:	**7.9**

NOTES

A Lab Code J0704831-011

B Total gallons recorded for the reporting period: September 16, 2007 (0000 hr) through October 15, 2007 (2400 hr).

C See Sample Calculation.

Sample Calculation for Vinyl Chloride (VC)

Mass Recovered (lbs)

[(3.7) lb VC / (1 x 10^9) lb H_2O] x (8.34) lb H_2O/gal H_2O x (224 637) gal H_2O = 0.0069 lb VC

Air Emissions from Air Stripper AS-2

Alaric Superfund Site, Tampa, Florida
Contract DACA45-98-D-022, Task 28

Intermediate Groundwater Treatment System						
Sample Date	Compound	AS-2 Influent (ug/L)	AS-2 Effluent (ug/L)	Influent - Effluent (ug/L)	Average Rate (gal/min)	Air Stripper Emission Rate (lb/day)
NOTES		A, C	B		D	C, D, E
10/09/07	Tetrachloroethene	< 0.16	0.74	-0.58	7.28	< 0.000014
	Trichloroethene	< 0.20	0.32	-0.12	7.28	< 0.000017
	cis-1,2-Dichloroethene	< 0.12	< 0.12	0.00	7.28	< 0.000010
	trans-1,2-Dichloroethene	< 0.11	< 0.11	0.00	7.28	< 0.000010
	1,1-Dichloroethene	< 0.16	< 0.16	0.00	7.28	< 0.000014
	Vinyl Chloride	< 0.12	< 0.12	0.00	7.28	< 0.000010
					TOTAL:	**< 0.000076**

NOTES

A Lab Code J0704831-014
B Lab Code J0704831-015
C Assumed 100% removal of compounds from groundwater via air stripping.
D See Sample Calculations.
E The FDEP maximum allowable emission limit for hazardous air pollutants (HAPs) from a remediation site is 13.7 lb/day.

Sample Calculations

Average Treatment Rate = Total Gallons Recovered over Hours of Operation
(224 637) gal H_2O / (30 846) min = 7.28 gal/min

Air Stripper Emission Rate (lb/day) for Vinyl Chloride (VC)
[(0.12) lb VC / (1 x 10^9) lb H_2O] x (8.34) lb H_2O/gal H_2O x (7.28) gal H_2O/min x (1 440) min/day = 0.000010 lb VC/day

Attachment C

Process Analytical Results

Summary of Process Analytical Results
October 9, 2007
Shallow Groundwater Recovery and Treatment System
Alaric Superfund Site, Tampa, Florida

Shallow GR&T System					USEPA Method 8260B (ug/L)					
Sample Port Number	Sample Name	Sample Location	Sample Date	Sample Time	1,1-Dichloroethene	Vinyl Chloride	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene (TCE)	Tetrachloroethene (PCE)
2	Central Influent	Central Influent	9-Oct-07	1027	1.8	6.9	2	220	190	370
4	5-Spot NW Influent	Northwest Influent	9-Oct-07	1033	1.7	4.7	2.1	210	200	350
5	Combined Influent	Combined Influent	9-Oct-07	1036	1.6	4.2	2	230	200	380
5	Waste Drum	(Coded Field Duplicate)	9-Oct-07	1039	1.5	4.2	2	200	170	350
8	GAC 2 Influent	Lead Carbon, GAC-2	9-Oct-07	1048	1.4	3.5	1.7	220	190	370
7	GAC 1 Influent	Lag Carbon, GAC-1	9-Oct-07	1052	<0.16	3.7	<0.11	0.73 i	1.1	1.8
9	AS 1 Influent	Air Stripper, AS-1	9-Oct-07	1057	<0.16	3.7	<0.11	<0.12	<0.20	0.82 i
10	AS 1 Effluent	Air Stripper, AS-1	9-Oct-07	1101	<0.16	<0.12	<0.11	<0.12	<0.20	<0.16
FDEP Groundwater Cleanup Target Level:					**7**	**1**	**100**	**70**	**3**	**3**

ug/L = micrograms per liter
< = U = *Indicates that the compound was analyzed for but not detected. The method detection limit is indicated.*
i = The reported value is between the the laboratory method detection limit and the laboratory practical quantitation limit.

Summary of Process Analytical Results
October 9, 2007
Intermediate Groundwater Recovery and Treatment System
Alaric Superfund Site, Tampa, Florida

Intermediate GR&T System					USEPA Method 8260B (ug/L)					
Sample Port Number	Sample Name	Sample Location	Sample Date	Sample Time	1,1-Dichloroethene	Vinyl Chloride	trans-1,2-Dichloroethene	cis-1,2-Dichloroethene	Trichloroethene (TCE)	Tetrachloroethene (PCE)
11	RW I1	Recovery Well, RW-I1	9-Oct-07	1107	2.1	0.86 i	16	160	540	33
12	RW I2	Recovery Well, RW-I2	9-Oct-07	1112	4	3	29	380	1,800	1,300
13	RW I3	Recovery Well, RW-I3	9-Oct-07	1125	3.5	5.5	26	290	2,700	3,100
16	GAC 4 Influent	Lead Carbon, GAC-4	9-Oct-07	1132	3.1	3.7	25	290	2,000	1,900
17	GAC 5 Influent	Intermediate Carbon, GAC-5	9-Oct-07	1206	0.67 i	4.9	3.2	79	64	17
15	GAC 3 Influent	Lag Carbon, GAC-3	9-Oct-07	1212	<0.16	2.3	<0.11	1.4	2.6	0.90 i
18	AS 2 Influent	Air Stripper, AS-2	9-Oct-07	1220	<0.16	<0.12	<0.11	<0.12	<0.20	<0.16
19	AS 2 Effluent	Air Stripper, AS-2	9-Oct-07	1225	<0.16	<0.12	<0.11	<0.12	0.32 i	0.74 i
FDEP Groundwater Cleanup Target Level:					**7**	**1**	**100**	**70**	**3**	**3**

ug/L = micrograms per liter
< = U = Indicates that the compound was analyzed for but not detected. The method detection limit is indicated.
i = The reported value is between the the laboratory method detection limit and the laboratory practical quantitation limit.

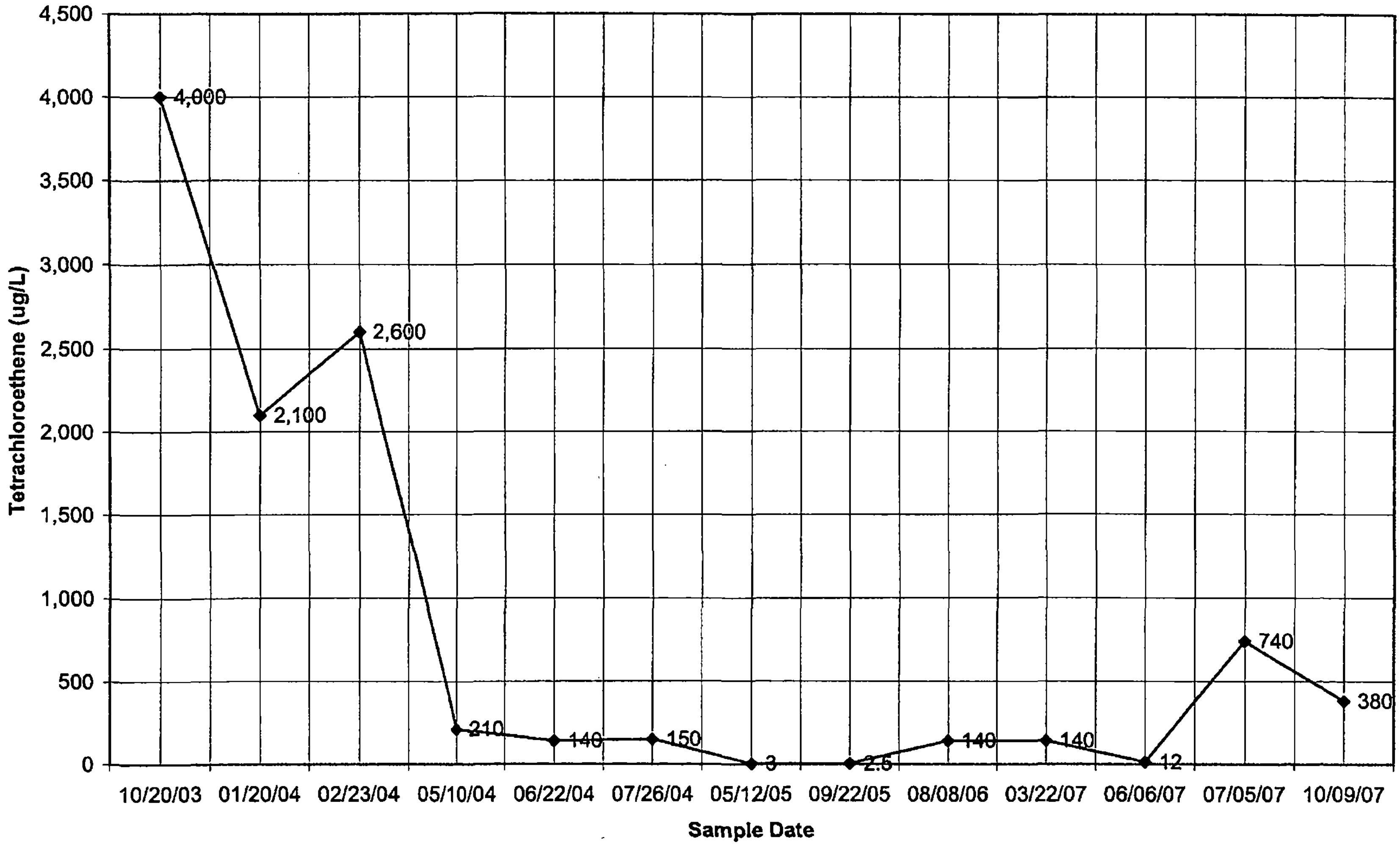
Attachment D

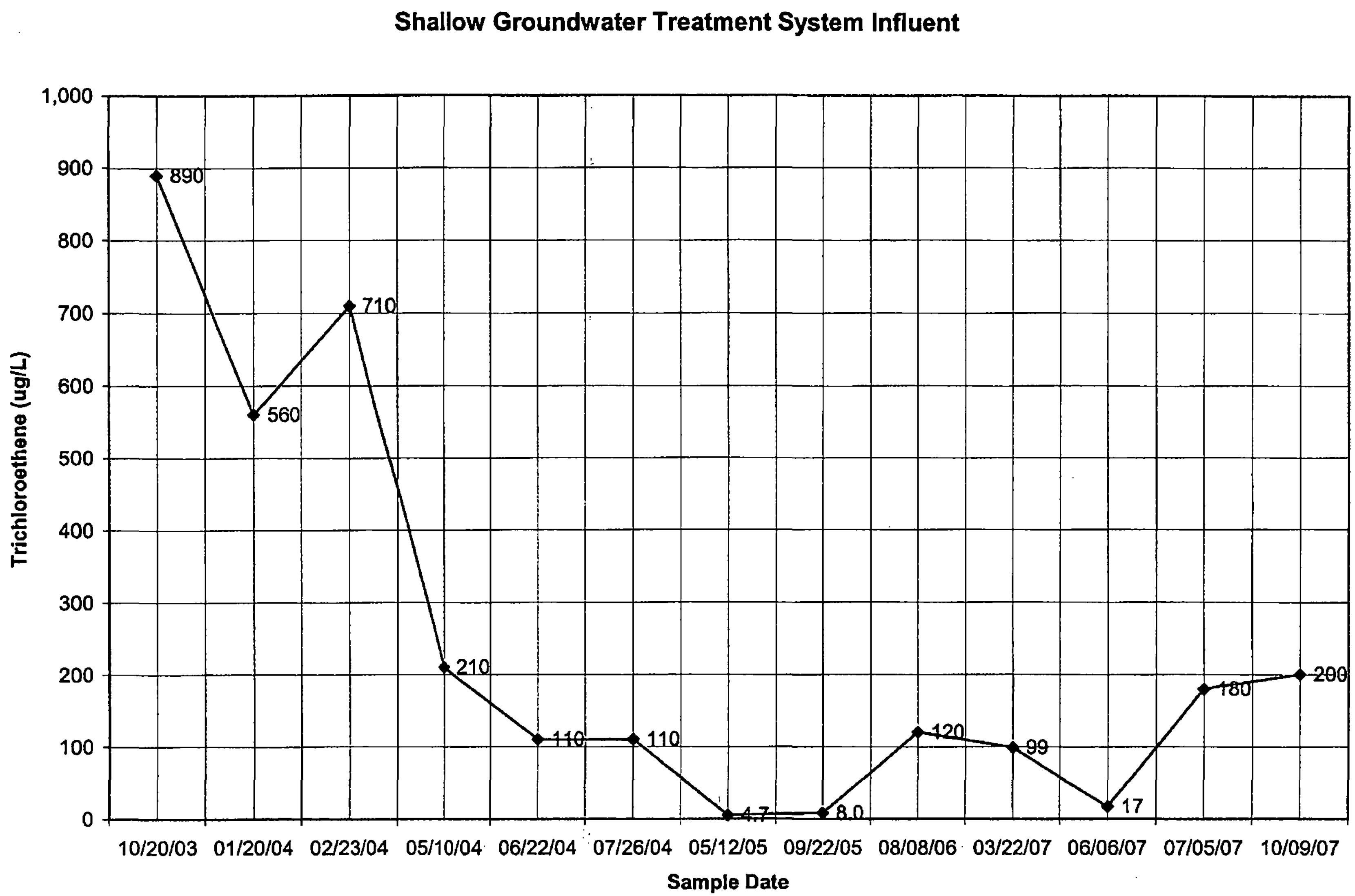
Influent Concentrations Over Time

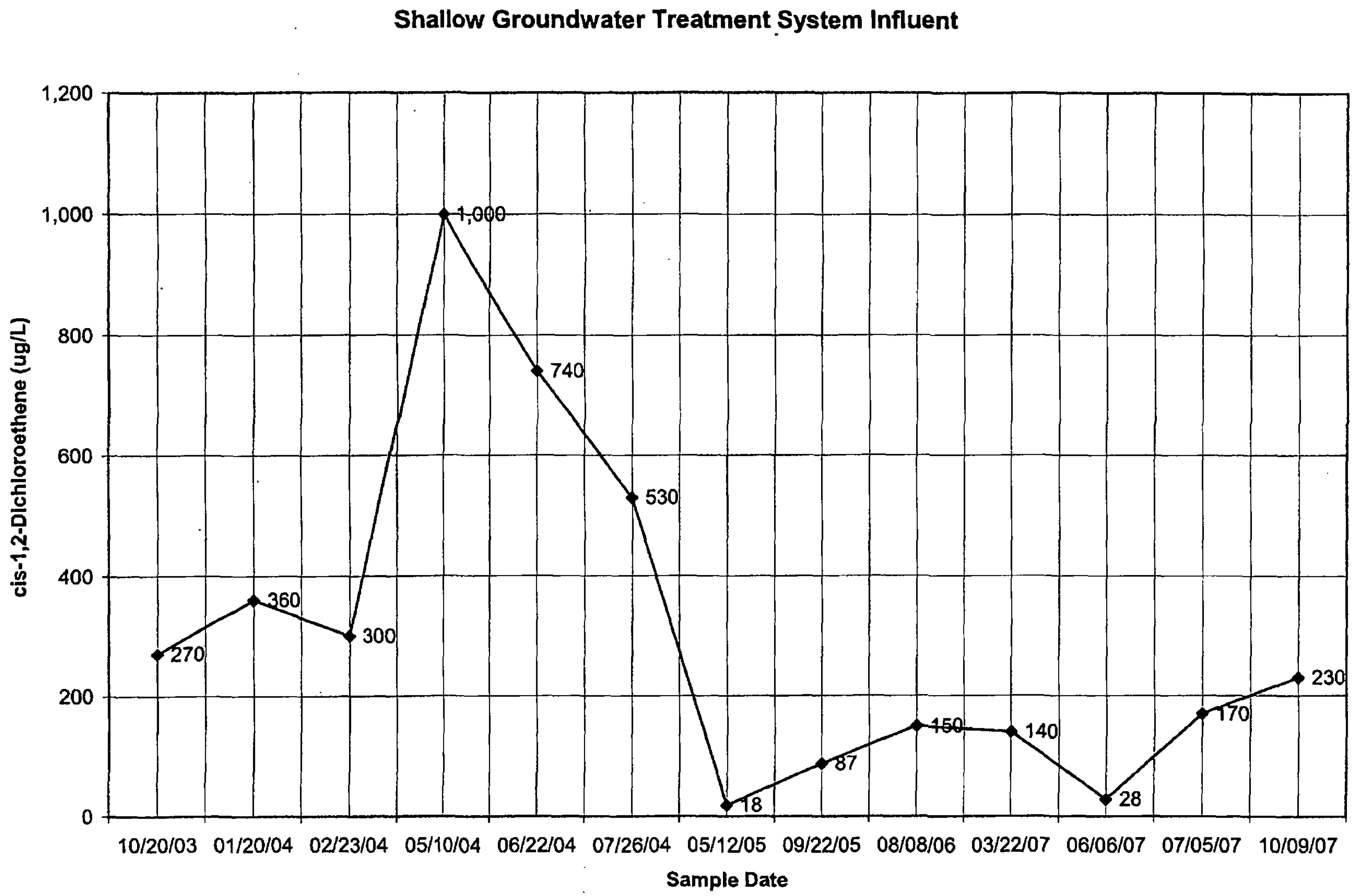
Alaric Superfund Site -- Tampa, Florida
Contract DACA45-98-D-022, Task 28

Tetrachloroethene

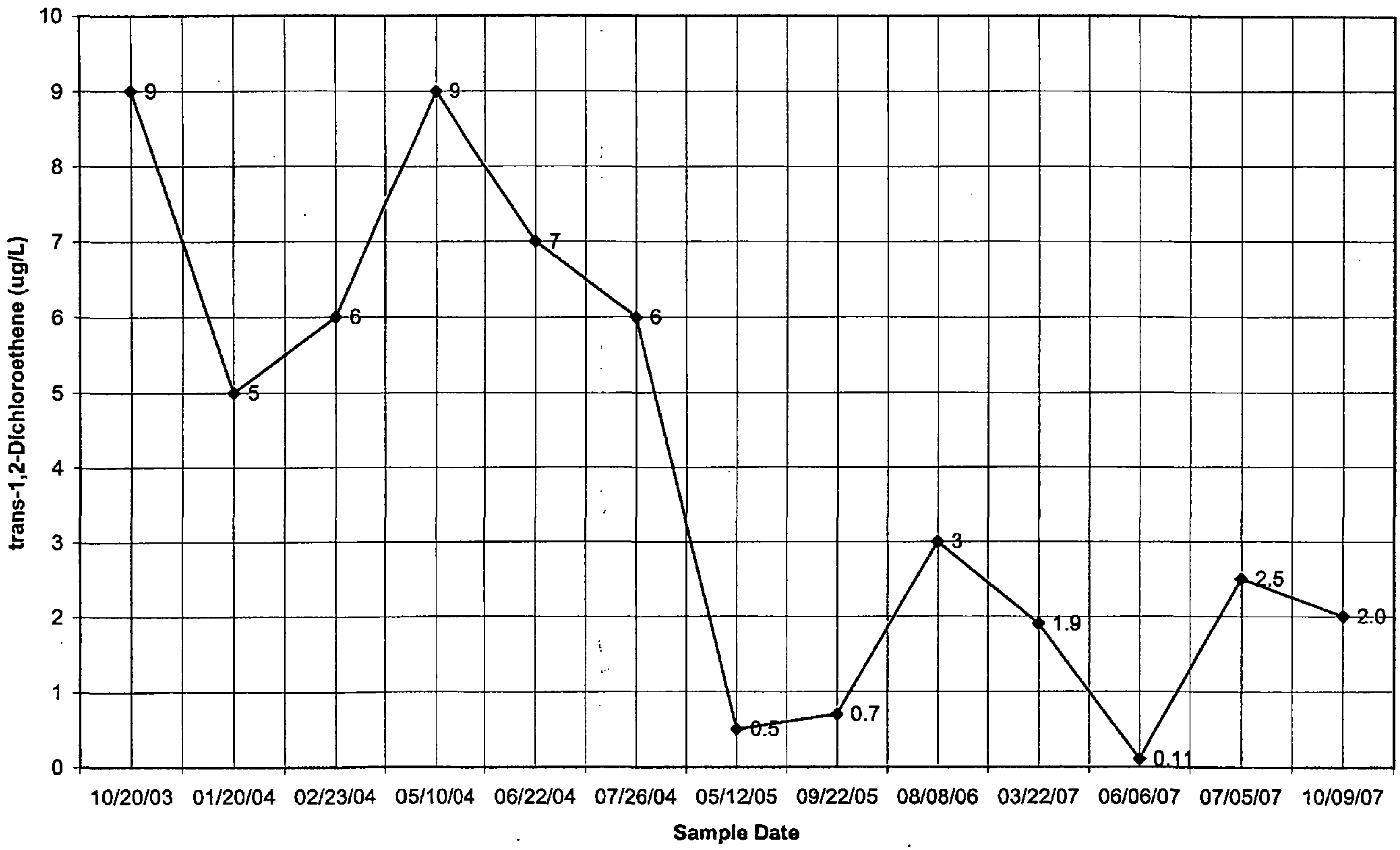
Shallow Groundwater Treatment System Influent



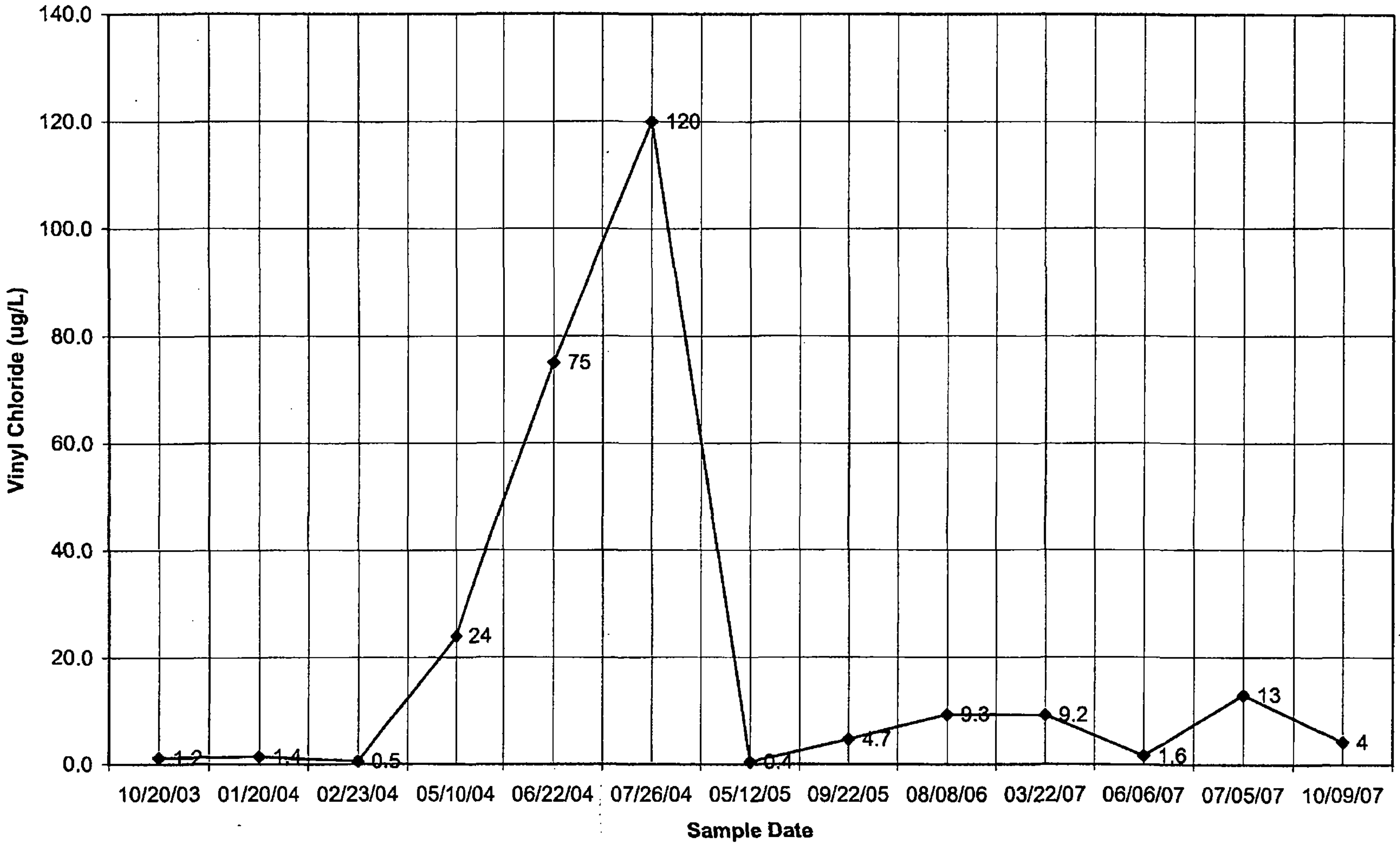

Shallow Groundwater Treatment System Influent
Trichloroethene (ug/L)
1,000
900
800
700
600
500
400
300
200
100
0
890
560
710
210
110
110
4.7
8.0
120
99
17
180
200
10/20/03
01/20/04
02/23/04
05/10/04
06/22/04
07/26/04
05/12/05
09/22/05
08/08/06
03/22/07
06/06/07
07/05/07
10/09/07
Sample Date

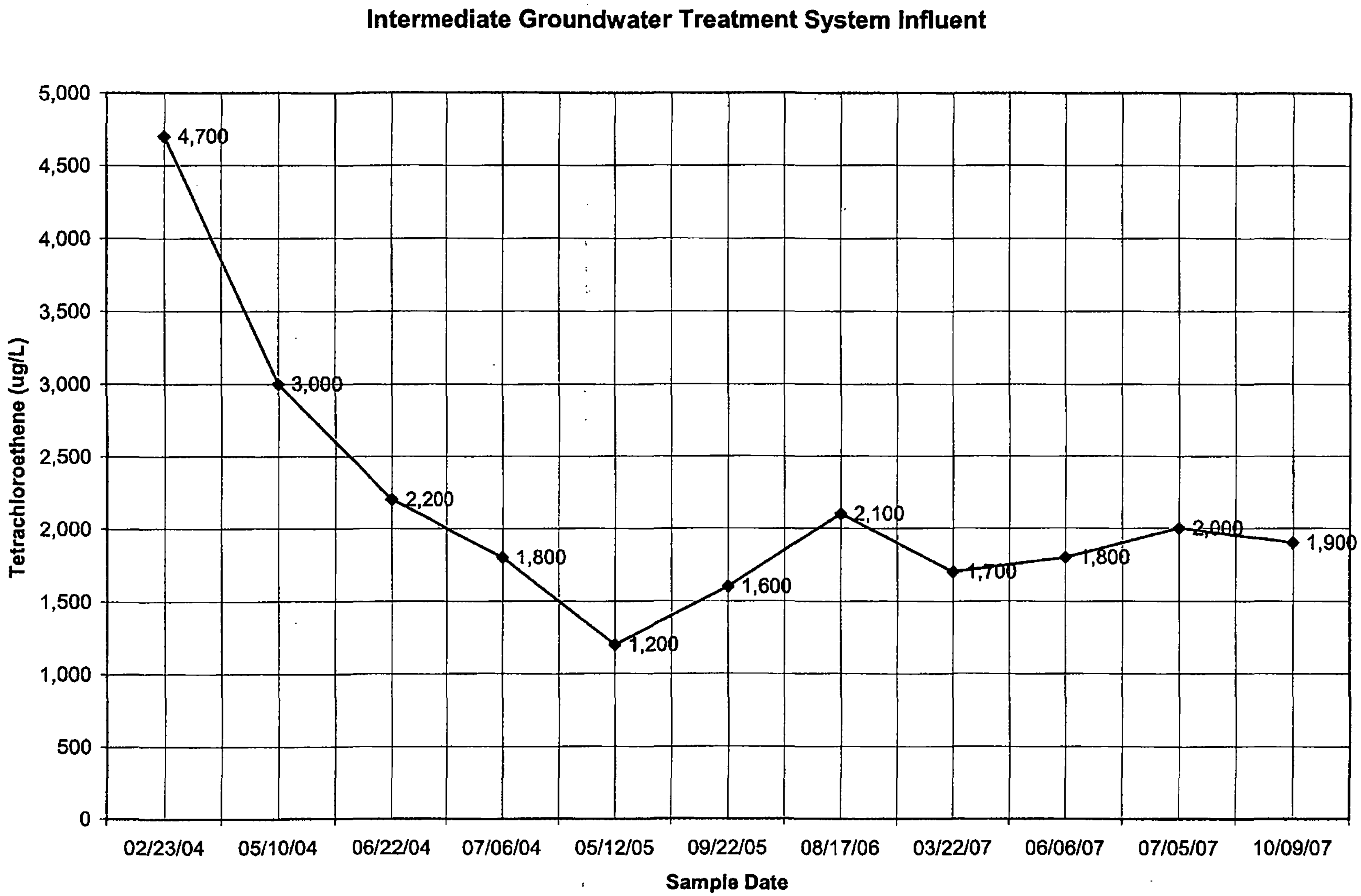

Shallow Groundwater Treatment System Influent
cis-1,2-Dichloroethene (ug/L)
1,200
1,000
800
600
400
200
0
270
360
300
1,000
740
530
18
87
150
140
28
170
230
10/20/03
01/20/04
02/23/04
05/10/04
06/22/04
07/26/04
05/12/05
09/22/05
08/08/06
03/22/07
06/06/07
07/05/07
10/09/07
Sample Date

Shallow Groundwater Treatment System Influent

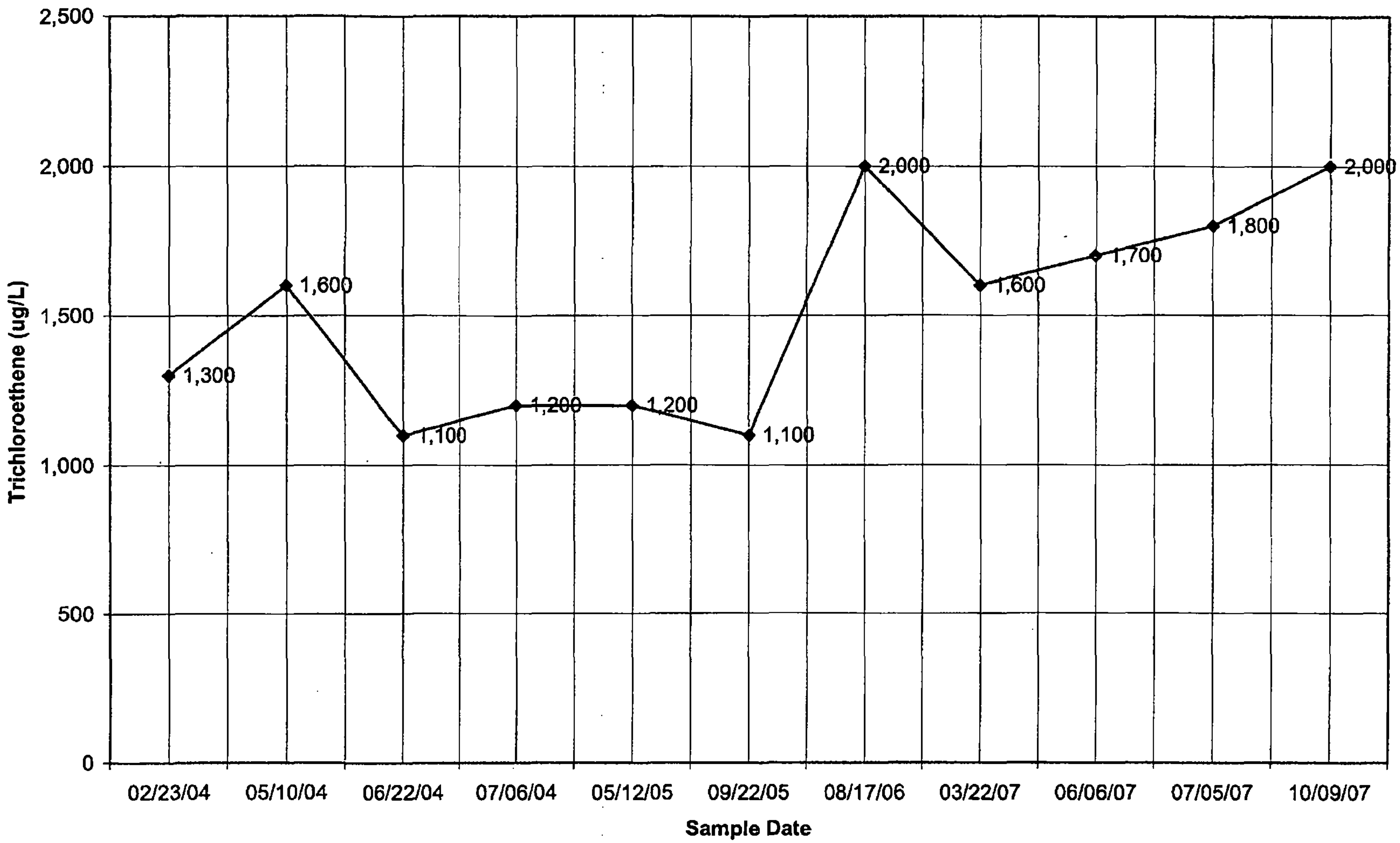


Shallow Groundwater Treatment System Influent

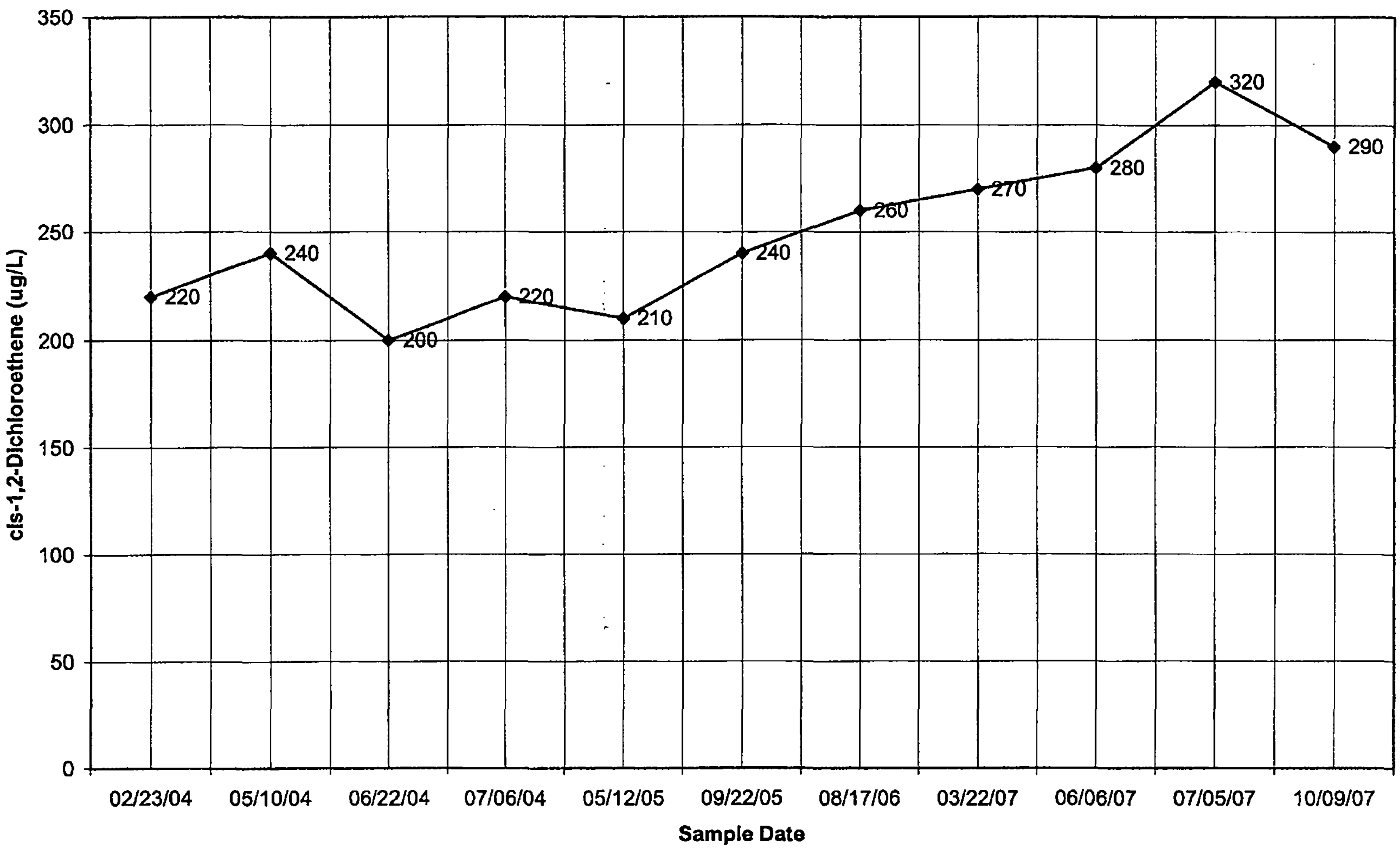


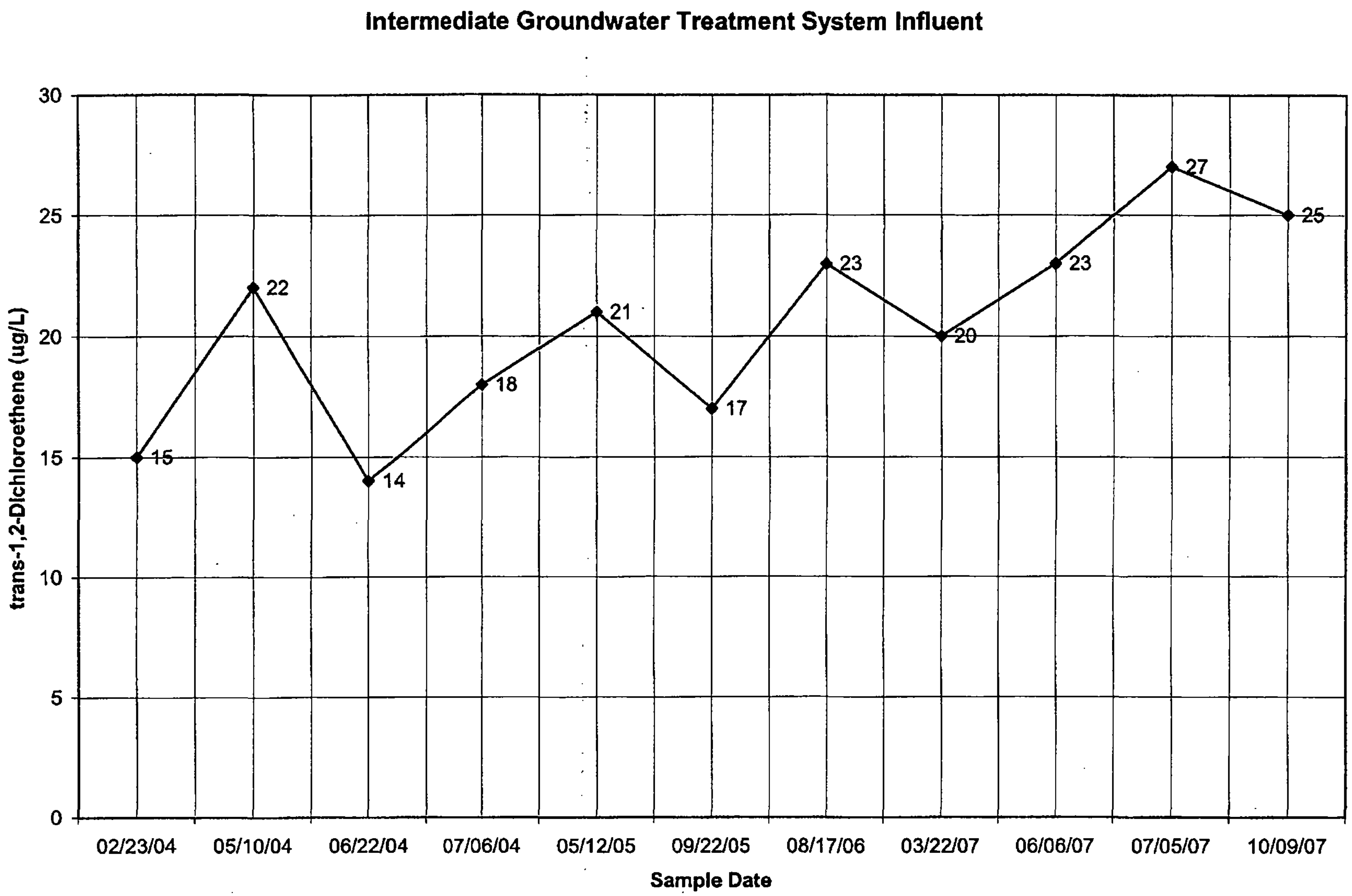

Intermediate Groundwater Treatment System Influent
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Tetrachloroethene (ug/L)
4,700
3,000
2,200
1,800
1,200
1,600
2,100
1,700
1,800
2,000
1,900
02/23/04
05/10/04
06/22/04
07/06/04
05/12/05
09/22/05
08/17/06
03/22/07
06/06/07
07/05/07
10/09/07
Sample Date

Intermediate Groundwater Treatment System Influent

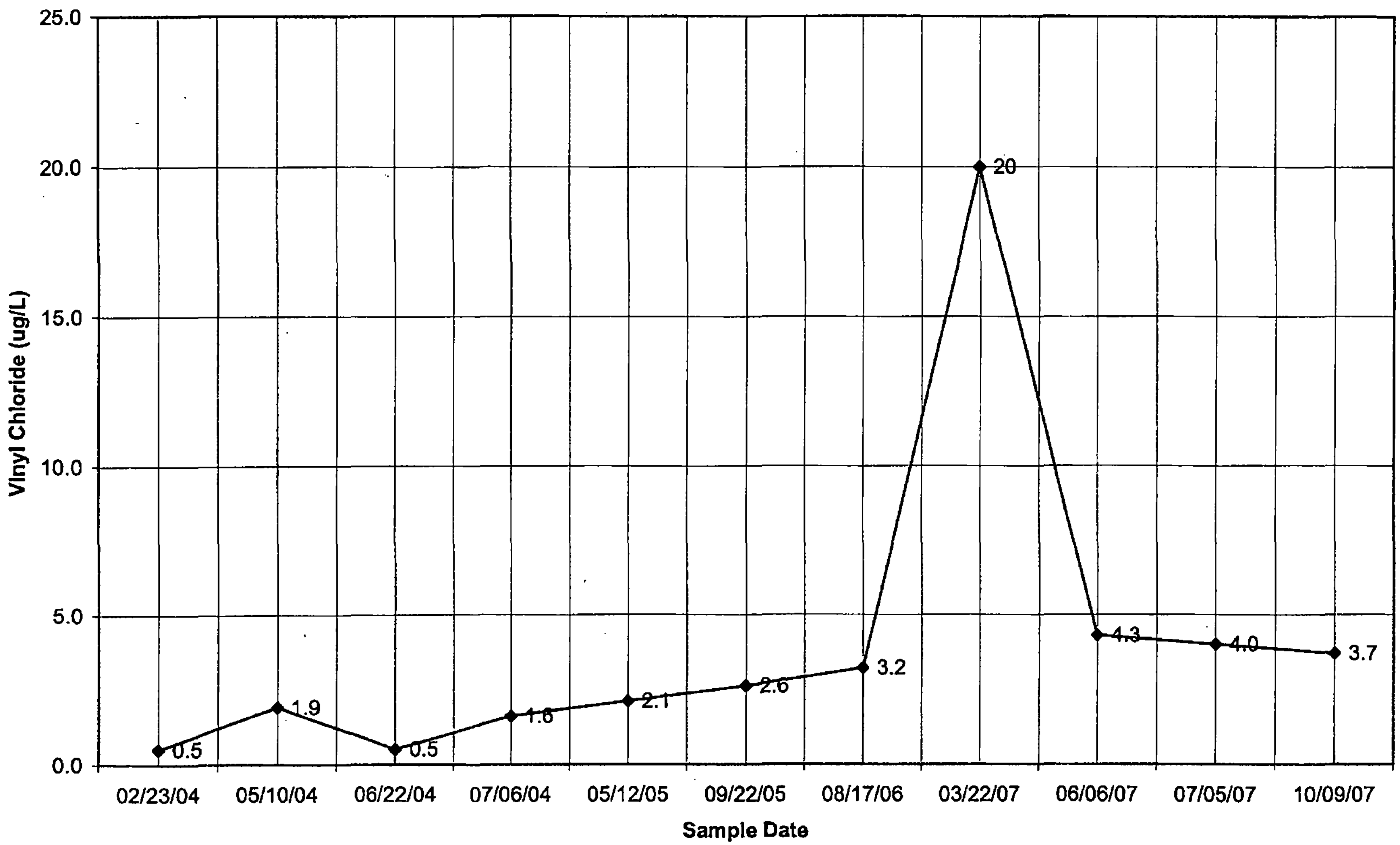


Intermediate Groundwater Treatment System Influent




Intermediate Groundwater Treatment System Influent
trans-1,2-Dichloroethene (ug/L)
Sample Date
0
5
10
15
20
25
30
02/23/04
05/10/04
06/22/04
07/06/04
05/12/05
09/22/05
08/17/06
03/22/07
06/06/07
07/05/07
10/09/07
15
22
14
18
21
17
23
20
23
27
25

Intermediate Groundwater Treatment System Influent



ATTACHMENT 7

Air Dispersion Modeling Report

Shaw® Shaw Environmental & Infrastructure, Inc.

A World of Solutions℠

August 13, 2007

Mr. Galo Jackson
Remedial Project Manager
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, S.W.
Atlanta, GA 30303

Dear Mr. Jackson:

RE: Optimization Report – Air Dispersion Modeling
Alaric Superfund Site
Tampa, Florida
Contract DACA45-98-D-022, Task No. 28

1.0 INTRODUCTION

Per your July 30, 2007, e-mail, Shaw Environmental, Inc. (Shaw) performed air dispersion modeling of the emissions from the air stripper exhaust stacks of both the intermediate aquifer (Intermediate System) and shallow aquifer (Shallow System) groundwater treatment systems at the Alaric Superfund Site in Tampa, Florida. This report presents the results of the modeling, along with model inputs and assumptions.

2.0 BACKGROUND

At the direction of the U.S. Environmental Protection Agency (USEPA), both treatment systems were turned off on July 24, 2007, and Shaw was subsequently requested to perform air dispersion modeling from both air stripper stacks of the treatment systems. Based in part on the review of this report, both treatment systems remain off until further direction from the USEPA.

3.0 APPROACH

Shaw's approach to air dispersion modeling included evaluation of two groundwater treatment scenarios. They included:

1. <u>**Scenario 1A:**</u> Air stripping, with no emissions treatment, followed by liquid-phase carbon adsorption.
2. <u>**Scenario 2A:**</u> Liquid-phase carbon adsorption followed by air stripping with no emissions treatment. Scenario 2A is the current configuration of both groundwater treatment systems.

In addition, both the above treatment scenarios were modeled using a reduction in stack diameter in order to increase its exit velocity so that a rain cap would not be necessary. These scenarios are labeled 1B and 2B.

Air dispersion modeling was performed using the USEPA SCREEN3 model. The model inputs and assumptions were as follows:

- A unit emission rate of 1 gram per second (g/s) was used for each model run. The resulting concentrations, in units of micrograms per cubic meter per grams per second (ug/m^3)/(g/s), were then scaled by the target compound emission rate from each system to arrive at the concentration (ug/m^3) of compounds from each system.
- The SCREEN 3 output concentrations are 1-hour average concentrations which were converted (multiplied by 0.08) to annual average concentrations for comparison to the ambient reference concentrations (ARCs).
- The Intermediate System and the Shallow System were modeled separately and then their results were combined for their total affect. In combining the results, it was assumed that the maximum offsite receptor concentration for each system occurred at the same location.
- The receptor distances started at the closest fenceline (approximately 8 meters) and then provided in 100-meter increments up to 10 kilometers. A receptor target (residence) location was specified at 322 meters (0.2 miles). Maximum off-site distance is also indicated.
- The maximum stack height modeled was 35 feet.
- Both air stripper stacks were modeled assuming no rain caps. Currently, the Shallow System stack is fitted with a rain cap while the Intermediate System stack is not.

The site specific model inputs and assumptions were as follows:

- The compounds of concern were vinyl chloride (VC), tetrachloroethene (PCE), and trichloroethene (TCE). The compounds cis-1,2-dichloroethene, trans-1,2-dichloroethene, and 1,1-dichloroethane were not included. Note, based on analytical data, the combined air emissions from both the Intermediate and Shallow System air strippers have never exceeded 13.7 pounds per day for these compounds.
- Per the USEPA, the ARCs used for VC, PCE, and TCE were their 10^{-6} cancer risk concentrations obtained from the USEPA Region 9 PRG Intercalc Tables: Air + H2O, dated October 2004. The CAL-Modified PRG was used for TCE.
- The air emission flow rates were based on recent temperature, pressure, and velocity field measurements at each stack. The flow rate for the Intermediate System was approximately 70 cubic feet per minute (ft^3/min) and the flow rate for the Shallow System was approximately 600 ft^3/min.
- The existing stack heights for the Intermediate System and the Shallow System are 18.5 feet and 18 feet above ground, respectively.

- For Scenarios 2A and 2B, the maximum compound concentrations detected in each of the air stripper exhaust stacks from the two most recent USEPA sampling events (October 2006 and June 2007) were used.
- For scenarios 1A and 1B, maximum groundwater concentrations detected to date were used to estimate the compound concentrations in the air stripper stack exhausts. Complete compound transfer from the groundwater to the air was assumed. Continuous groundwater flow rates used for the Intermediate System and Shallow System were 8 gallons per minute (gal/min) and 4 gal/min, respectively. Continuous air flow rates used for the Intermediate System and Shallow System were 70 ft^3/min and 600 ft^3/min, respectively.

The site specific inputs for each scenario are provided in Attachment A.

4.0 DISCUSSION OF RESULTS

Table 1 presents the minimum air stripper stack height that is required to achieve exhaust concentrations below the 10^{-6} cancer risk for VC, PCE, and TCE at the maximum offsite and residence receptor distances. Attachment B presents the compound concentrations at the maximum off-site and residence receptor distances as a function of stack height for the Intermediate and Shallow Systems, separately and combined. Attachment C presents the SCREEN3 model data files.

The following presents a discussion of results for each scenario evaluated.

Scenario 2A – Liquid-Phase Carbon Adsorption followed by Air Stripping

At the current stack heights of 18.5 feet for the Intermediate System and 18 feet for the Shallow System, results of the modeling indicate combined stack exhaust concentrations at least two orders of magnitude below the 10^{-6} cancer risk concentrations for VC, PCE, and TCE at the maximum off-site and residence receptor distances (see Attachment B).

Scenario 2B – Liquid-Phase Carbon Adsorption followed by Air Stripping, Stack Diameter Outlet Reduced

The current air stripper exhaust stack diameters (i.e., release point diameters) for the Intermediate System and the Shallow System are nominally 3 inches and 8 inches, respectively. To increase stack exit velocities so that rain caps are not needed, dispersion modeling was evaluated at reduced release point diameters of 2 inches and 6 inches, respectively. (This could be accomplished by installing the appropriate concentric reducer atop each stack.) At current stack heights, results of the modeling indicate combined stack exhaust concentrations at least two orders of magnitude below the 10^{-6} cancer risk concentrations for VC, PCE, and TCE at the maximum off-site and residence receptor distances (see Attachment B).

Scenario 1A – Air Stripping followed by Liquid-Phase Carbon Adsorption

Under this scenario (as well as Scenario 1B), VC is the controlling compound. At the current stack heights and diameters, modeling results indicate that the combined VC concentration is nominal at the residence receptor distance and exceeds its 10^{-6} cancer risk concentration at the maximum off-site receptor distance. Similarly, the combined PCE concentration is below its 10^{-6} cancer risk concentration at the resident receptor distance but exceeds its cancer risk at the maximum off-site receptor distance. The combined TCE concentration is below its 10^{-6} cancer risk concentration at both the residence and maximum off-site receptor distances (see Attachment B).

Scenario 1B – Air Stripping followed by Liquid-Phase Carbon Adsorption, Stack Diameter Outlet Reduced

The current air stripper exhaust stack diameters (i.e., release point diameters) for the Intermediate System and the Shallow System are nominally 3 inches and 8 inches, respectively. To increase stack exit velocities so that rain caps are not needed, dispersion modeling was evaluated at reduced release point diameters of 2 inches and 6 inches, respectively. (This could be accomplished by installing the appropriate concentric reducer atop each stack.)

Under this scenario (as well as Scenario 1A), VC is the controlling compound. The modeling results indicate that the combined VC concentration is nominal at the residence receptor distance and exceeds its 10^{-6} cancer risk concentration at the maximum off-site receptor distance. Similarly, the combined PCE concentration is below its 10^{-6} cancer risk concentration at the resident receptor distance but exceeds its cancer risk at the maximum off-site receptor distance. The combined TCE concentration is below its 10^{-6} cancer risk concentration at both the residence and maximum off-site receptor distances (see Attachment B).

5.0 SUMMARY

Given the current groundwater treatment configuration (i.e., liquid-phase carbon adsorption followed by air stripping) of both the Shallow and Intermediate Systems, results of the SCREEN3 air dispersion modeling indicate that the air stripper exhaust concentrations of VC, PCE, and TCE are below their respective 10^{-6} cancer risk concentrations at the residence and maximum off-site receptor distances.

Should the groundwater treatment system be reconfigured to air stripping followed by carbon adsorption (Scenario 1), SCREEN3 results indicate that the air stripper exhaust stacks would require heightening and/or the addition of vapor-phase treatment to achieve 10^{-6} cancer risk concentrations at both the residence and maximum off-site receptor distances.

Please call me, at 419-425-6304, or Mr. John Nenni, at 419-425-6288, if you have any questions.

Sincerely,

Christopher P. Strzempka, P.G.
Geologist

cps:CPS

Attachments

pc: Matt Ellender, USACE RPD
Mike Schultz, USACE JAX
Frank Zepka, USACE JAX
John Nenni, Shaw
Eric Haydu, Shaw
Cal Butler, Shaw

Table 1

Stack Height Summary - Vinyl Chloride, Tetrachloroethene, Trichloroethene
SCREEN3 Model Results
Alaric Superfund Site, Tampa, Florida
Contract Number DACA45-98-D-022, Task 28

Scenario	Treatment System Configuration	Minimum Air Stripper Exhaust Stack Height (ft)					
		Shallow System		Intermediate System		Combined Operation[B]	
		Max Off-Site	Residence[A]	Max Off-Site	Residence[A]	Max Off-Site	Residence[A]
1A	Air Stripping followed by Liquid-Phase Carbon	25	18	Not Determined, >35	18.5	Not Determined, >35	25
1B	Air Stripping, with reduced stack outlet diameter, followed by Liquid-Phase Carbon	25	18	Not Determined, >35	18.5	Not Determined, >35	25
2A	Liquid-Phase Carbon followed by Air Stripping	18	18	18.5	18.5	18 & 18.5	18 & 18.5
2B	Liquid-Phase Carbon followed by Air Stripping with reduced stack outlet diameter	18	18	18.5	18.5	18 & 18.5	18 & 18.5

A = The residence is 0.2 miles (322 meters) from the stack.
B = Required minimum stack height(s) if both treatment system are operating.

Attachment A

Site-Specific Inputs

Treatment Sequence: Air Stripping (Untreated Exhaust) and Liquid-Phase Carbon Adsorption

INPUTS, ENGLISH	UNIT	INTERMEDIATE	SHALLOW	INPUTS, METRIC	UNIT	INTERMEDIATE	SHALLOW
Release Type	--	gaseous	gaseous	Release Type	--	gaseous	gaseous
Source Type	--	stack	stack	Source Type	--	stack	stack
Emission Rate (air)	lb/sec	0.09	0.72	Emission Rate	g/s	38.6	328.4
Exit Velocity	ft/sec	23.1	32.0	Exit Velocity	m/s	7.0	9.8
Release Height	ft	variable	variable	Release Height	m	variable	variable
Release Point Diameter	ft	0.25	0.63	Release Point Diameter	m	0.08	0.19
Release Temperature	°R	544.5	548.6	Release Temperature	K	302.5	304.8
Ambient Temperature	°R	variable	variable	Ambient Temperature	K	variable	variable
Building Height	ft	16	16	Building Height	m	4.88	4.88
Building Width, min	ft	88.8	88.8	Building Width, min	m	27.07	27.07
Building Width, max	ft	98.4	98.4	Building Width, max	m	29.99	29.99
Classification	--	urban	urban	Classification	--	urban	urban
Fenceline Distance	ft	26.4	26.4	Fenceline Distance	m	8.05	8.05
Terrain	--	flat	flat	Terrain	--	flat	flat
Elevated Receptor Heights	--	no	no	Elevated Receptor Heights	--	no	no
Averaging Time	hr	24	24	Averaging Time	hr	24	24
Flow Rate	ft^3/sec	1.2	10.0	Flow Rate	m^3/s	0.033	0.283
Receptor Target (residence)	mile	0.2	0.2	Receptor Target (residence)	m	322	322
				Est. from Groundwater Data	UNIT	INTERMEDIATE	SHALLOW
Molar Volume, Release	$ft^3/lb\text{-}mole$	397.56	400.51	VC	ug/m^3	71,759	3,562
Molecular Weight (air)	lb/lb-mole	29	29	PCE	ug/m^3	30,536	793
Flow (blower P&ID spec)	ft^3/min	70	600	TCE	ug/m^3	305	107
Exit Velocity	ft/min	1,387	1,922	c-1,2-DCE	ug/m^3		
Groundwater Recovery Rate	gal/min	8	4	t-1,2-DCE	ug/m^3		
Stack Height above ground	ft	18.5	18	1,1-DCA	ug/m^3		

Changes and/or additions are highlighted in yellow.

Treatment Sequence: Liquid-Phase Carbon Adsorption and Air Stripping (Untreated Exhaust)

INPUTS, ENGLISH	UNIT	INTERMEDIATE	SHALLOW	INPUTS, METRIC	UNIT	INTERMEDIATE	SHALLOW
Release Type	–	gaseous	gaseous	Release Type	–	gaseous	gaseous
Source Type	–	stack	stack	Source Type	–	stack	stack
Emission Rate (air)	lb/sec	0.09	0.72	Emission Rate	g/s	38.6	328.4
Exit Velocity	ft/sec	23.1	32.0	Exit Velocity	m/s	7.0	9.8
Release Height	ft	variable	variable	Release Height	m	variable	variable
Release Point Diameter	ft	0.25	0.63	Release Point Diameter	m	0.08	0.19
Release Temperature	°R	544.5	548.6	Release Temperature	K	302.5	304.8
Ambient Temperature	°R	variable	variable	Ambient Temperature	K	variable	variable
Building Height	ft	16	16	Building Height	m	4.88	4.88
Building Width, min	ft	88.8	88.8	Building Width, min	m	27.07	27.07
Building Width, max	ft	98.4	98.4	Building Width, max	m	29.99	29.99
Classification	–	urban	urban	Classification	–	urban	urban
Fenceline Distance	ft	26.4	26.4	Fenceline Distance	m	8.05	8.05
Terrain	–	flat	flat	Terrain	–	flat	flat
Elevated Receptor Heights	–	no	no	Elevated Receptor Heights	–	no	no
Averaging Time	hr	24	24	Averaging Time	hr	24	24
Flow Rate	ft^3/sec	1.2	10.0	Flow Rate	m^3/s	0.033	0.283
Receptor Target (residence)	mile	0.2	0.2	Receptor Target (residence)	m	322	322
				2006 & 2007 Data, highest	UNIT	INTERMEDIATE	SHALLOW
Molar Volume, Release	ft^3/lb-mole	397.56	400.51	VC	ug/m^3	0.58	55
Molecular Weight (air)	lb/lb-mole	29	29	PCE	ug/m^3	310	2.0
Flow (blower P&ID spec)	ft^3/min	70	600	TCE	ug/m^3	160	1.4
Exit Velocity	ft/min	1,387	1,922	c-1,2-DCE	ug/m^3		
Groundwater Recovery Rate	gal/min	8	4	t-1,2-DCE	ug/m^3		
Stack Height above ground	ft	18.5	18	1,1-DCA	ug/m^3		

Changes and/or additions are highlighted in yellow.

Treatment Sequence: Air Stripping (Untreated Exhaust) and Liquid-Phase Carbon Adsorption

INPUTS, ENGLISH	UNIT	INTERMEDIATE	SHALLOW	INPUTS, METRIC	UNIT	INTERMEDIATE	SHALLOW
Release Type	--	gaseous	gaseous	Release Type	--	gaseous	gaseous
Source Type	--	stack	stack	Source Type	--	stack	stack
Emission Rate (air)	lb/sec	0.09	0.72	Emission Rate	g/s	38.6	328.4
Exit Velocity	ft/sec	50.9	50.4	Exit Velocity	m/s	15.5	15.4
Release Height	ft	variable	variable	Release Height	m	variable	variable
Release Point Diameter	ft	0.17	0.50	Release Point Diameter	m	0.05	0.15
Release Temperature	°R	544.5	548.6	Release Temperature	K	302.5	304.8
Ambient Temperature	°R	variable	variable	Ambient Temperature	K	variable	variable
Building Height	ft	16	16	Building Height	m	4.88	4.88
Building Width, min	ft	88.8	88.8	Building Width, min	m	27.07	27.07
Building Width, max	ft	98.4	98.4	Building Width, max	m	29.99	29.99
Classification	--	urban	urban	Classification	--	urban	urban
Fenceline Distance	ft	26.4	26.4	Fenceline Distance	m	8.05	8.05
Terrain	--	flat	flat	Terrain	--	flat	flat
Elevated Receptor Heights	--	no	no	Elevated Receptor Heights	--	no	no
Averaging Time	hr	24	24	Averaging Time	hr	24	24
Flow Rate	ft^3/sec	1.2	10.0	Flow Rate	m^3/s	0.033	0.283
Receptor Target (residence)	mile	0.2	0.2	Receptor Target (residence)	m	322	322
				Est. from Groundwater Data	UNIT	INTERMEDIATE	SHALLOW
Molar Volume, Release	ft^3/lb-mole	397.56	400.51	VC	ug/m^3	71,759	3,562
Molecular Weight (air)	lb/lb-mole	29	29	PCE	ug/m^3	30,536	793
Flow	ft^3/min	70	600	TCE	ug/m^3	305	107
Exit Velocity	ft/min	3,057	3,024	c-1,2-DCE	ug/m^3		
Groundwater Recovery Rate	gal/min	8	4	t-1,2-DCE	ug/m^3		
Stack Height above ground	ft	18.5	18	1,1-DCA	ug/m^3		

Changes and/or additions are highlighted in yellow.

Treatment Sequence: Liquid-Phase Carbon Adsorption and Air Stripping (Untreated Exhaust)

INPUTS, ENGLISH	UNIT	INTERMEDIATE	SHALLOW	INPUTS, METRIC	UNIT	INTERMEDIATE	SHALLOW
Release Type	–	gaseous	gaseous	Release Type	–	gaseous	gaseous
Source Type	–	stack	stack	Source Type	–	stack	stack
Emission Rate (air)	lb/sec	0.09	0.72	Emission Rate	g/s	38.6	328.4
Exit Velocity	ft/sec	50.9	50.4	Exit Velocity	m/s	15.5	15.4
Release Height	ft	variable	variable	Release Height	m	variable	variable
Release Point Diameter	ft	0.17	0.50	Release Point Diameter	m	0.05	0.15
Release Temperature	°R	544.5	548.6	Release Temperature	K	302.5	304.8
Ambient Temperature	°R	variable	variable	Ambient Temperature	K	variable	variable
Building Height	ft	16	16	Building Height	m	4.88	4.88
Building Width, min	ft	88.8	88.8	Building Width, min	m	27.07	27.07
Building Width, max	ft	98.4	98.4	Building Width, max	m	29.99	29.99
Classification	–	urban	urban	Classification	–	urban	urban
Fenceline Distance	ft	26.4	26.4	Fenceline Distance	m	8.05	8.05
Terrain	–	flat	flat	Terrain	–	flat	flat
Elevated Receptor Heights	–	no	no	Elevated Receptor Heights	–	no	no
Averaging Time	hr	24	24	Averaging Time	hr	24	24
Flow Rate	ft^3/sec	1.2	10.0	Flow Rate	m^3/s	0.033	0.283
Receptor Target (residence)	mile	0.2	0.2	Receptor Target (residence)	m	322	322
				2006 & 2007 Data, highest	UNIT	INTERMEDIATE	SHALLOW
Molar Volume, Release	ft^3/lb-mole	397.56	400.51	VC	ug/m^3	0.58	55
Molecular Weight (air)	lb/lb-mole	29	29	PCE	ug/m^3	310	2.0
Flow	ft^3/min	70	600	TCE	ug/m^3	160	1.4
Exit Velocity	ft/min	3,057	3,024	c-1,2-DCE	ug/m^3		
Groundwater Recovery Rate	gal/min	8	4	t-1,2-DCE	ug/m^3		
Stack Height above ground	ft	18.5	18	1,1-DCA	ug/m^3		

Changes and/or additions are highlighted in yellow.

COMPOUND	ABBRV	MW	Ambient Air(1) Cancer Risk = 1E-06 (ug/m³)	Ambient Air(1) Chronic HQ = 1 (ug/m³)
Vinyl Chloride	VC	63	0.11	
Tetrachloroethene	PCE	166	0.32	
Trichloroethene(2)	TCE	131	0.96	
cis-1,2-Dichloroethene	c-1,2-DCE	97		
trans-1,2-Dichloroethene	t-1,2-DCE	97		
1,1-Dichloroethane	1,1-DCA	99		

(1) Source: 07/30/07 Galo Jackson (USEPA Region 4) e-mail
(1) Source: USEPA Region 9 PRG Intercalc Tables: Air + H2O, October 2004
(2) Note: "CAL-Modified PRG" for Trichloroethene: 0.96 ug/m³ Cancer Risk

The modeling should attempt to predict the stack height necessary no to exceed the concentrations shown for the following compounds: PCE, TCE, and VC.

Attachment B

SCREEN3 Model Results

Scenario	SCENARIO 1A								
Compound	Vinyl Chloride			Tetrachloroethene			Trichloroethene		
Emission Parameters	Intermediate System	Shallow System		Intermediate System	Shallow System		Intermediate System	Shallow System	
Concentration in Stack Exhaust (ug/m^3)	71,759	3,562		30,536	793		305	107	
Emission Rate (g/s)	2.37E-03	1.01E-03		1.01E-03	2.25E-04		1.01E-05	3.03E-05	
Modeling Results	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined
Modeled Stack Height (ft) - BASELINE	18.5	18	--	18.5	18	--	18.5	18	--
Actual Annual Concentration (ug/m^3) - Max Offsite	1.33	0.41	1.74	0.57	0.09	0.66	5.65E-03	1.22E-02	1.79E-02
Actual Annual Concentration (ug/m^3) - Residence	0.08	0.03	0.11	0.03	0.01	0.04	3.42E-04	9.76E-04	1.32E-03
Modeled Stack Height (ft)	20	20	--	20	20	--	20	20	--
Actual Annual Concentration (ug/m^3) - Max Offsite	1.08	0.34	1.42	0.46	0.08	0.54	4.59E-03	1.02E-02	1.48E-02
Actual Annual Concentration (ug/m^3) - Residence	0.08	0.03	0.11	0.03	0.01	0.04	3.43E-04	9.52E-04	1.30E-03
Modeled Stack Height (ft)	25	25	--	25	25	--	25	25	--
Actual Annual Concentration (ug/m^3) - Max Offsite	0.48	0.10	0.58	0.20	0.02	0.23	2.03E-03	2.98E-03	5.01E-03
Actual Annual Concentration (ug/m^3) - Residence	0.07	0.03	0.10	0.03	0.01	0.04	3.00E-04	8.30E-04	1.13E-03
Modeled Stack Height (ft)	30	30	--	30	30	--	30	30	--
Actual Annual Concentration (ug/m^3) - Max Offsite	0.35	0.08	0.43	0.15	0.02	0.17	1.50E-03	2.40E-03	3.89E-03
Actual Annual Concentration (ug/m^3) - Residence	0.07	0.03	0.09	0.03	0.01	0.03	2.89E-04	7.86E-04	1.08E-03
Modeled Stack Height (ft)	35	35	--	35	35	--	35	35	--
Actual Annual Concentration (ug/m^3) - Max Offsite	0.27	0.07	0.33	0.11	0.01	0.13	1.14E-03	1.96E-03	3.10E-03
Actual Annual Concentration (ug/m^3) - Residence	0.07	0.02	0.09	0.03	0.01	0.03	2.84E-04	7.27E-04	1.01E-03

Intermediate System Stack Flow Rate =	70	cu ft/min =	1.98 m^3/min
Shallow System Stack Flow Rate =	600	cu ft/min =	16.99 m^3/min
SCREEN3 Conversion from 1-Hr to Annual =	0.08		

Compound	Ambient Air[1] Cancer Risk = 1E-06 (ug/m^3)
Vinyl Chloride	0.11
Tetrachloroethene	0.32
Trichloroethene[2]	0.96

(1) Source: 07/30/07 Galo Jackson (USEPA Region 4) e-mail
(1) Source: USEPA Region 9 PRG Intercalc Tables: Air + H2O, October 2004
(2) Note: "CAL-Modified PRG" for Trichloroethene: 0.96 ug/m^3 Cancer Risk

Scenario	SCENARIO 2A								
Compound	Vinyl Chloride			Tetrachloroethene			Trichloroethene		
Emission Parameters	Intermediate System	Shallow System		Intermediate System	Shallow System		Intermediate System	Shallow System	
Concentration in Stack Exhaust (ug/m^3)	0.58	55		310	2		160	1.4	
Emission Rate (g/s)	1.92E-08	1.56E-05		1.02E-05	5.66E-07		5.29E-06	3.96E-07	
Modeling Results	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined
Modeled Stack Height (ft) - BASELINE	18.5	18	--	18.5	18	--	18.5	18	--
Actual Annual Concentration (ug/m^3) - Max Offsite	1.08E-05	6.27E-03	6.28E-03	5.75E-03	2.28E-04	5.98E-03	2.97E-03	1.60E-04	3.13E-03
Actual Annual Concentration (ug/m^3) - Residence	6.51E-07	5.02E-04	5.02E-04	3.48E-04	1.82E-05	3.66E-04	1.80E-04	1.28E-05	1.92E-04
Modeled Stack Height (ft)	20	20	--	20	20	--	20	20	--
Actual Annual Concentration (ug/m^3) - Max Offsite	8.74E-06	5.25E-03	5.25E-03	4.67E-03	1.91E-04	4.86E-03	2.41E-03	1.34E-04	2.54E-03
Actual Annual Concentration (ug/m^3) - Residence	6.52E-07	4.90E-04	4.90E-04	3.49E-04	1.78E-05	3.66E-04	1.80E-04	1.25E-05	1.92E-04
Modeled Stack Height (ft)	25	25	--	25	25	--	25	25	--
Actual Annual Concentration (ug/m^3) - Max Offsite	3.86E-06	1.53E-03	1.54E-03	2.06E-03	5.57E-05	2.12E-03	1.06E-03	3.90E-05	1.10E-03
Actual Annual Concentration (ug/m^3) - Residence	5.70E-07	4.27E-04	4.27E-04	3.05E-04	1.55E-05	3.20E-04	1.57E-04	1.09E-05	1.68E-04
Modeled Stack Height (ft)	30	30	--	30	30	--	30	30	--
Actual Annual Concentration (ug/m^3) - Max Offsite	2.84E-06	1.23E-03	1.23E-03	1.52E-03	4.48E-05	1.57E-03	7.85E-04	3.14E-05	8.16E-04
Actual Annual Concentration (ug/m^3) - Residence	5.50E-07	4.04E-04	4.04E-04	2.94E-04	1.47E-05	3.09E-04	1.52E-04	1.03E-05	1.62E-04
Modeled Stack Height (ft)	35	35	--	35	35	--	35	35	--
Actual Annual Concentration (ug/m^3) - Max Offsite	2.16E-06	1.01E-03	1.01E-03	1.16E-03	3.67E-05	1.19E-03	5.97E-04	2.57E-05	6.22E-04
Actual Annual Concentration (ug/m^3) - Residence	5.41E-07	3.74E-04	3.74E-04	2.89E-04	1.36E-05	3.03E-04	1.49E-04	9.52E-06	1.59E-04

SCREEN3 Modeling Results for Intermediate and Shallow Systems
Scenarios 1A, 2A
Alaric Superfund Site - Tampa, FL

Scenarios 1A, 2A

Receptor Distance (m)	Baseline Stack Ht 1-Hr Unit Conc (ug/m³)/(g/s)		Stack Ht = 20 ft 1-Hr Unit Conc (ug/m³)/(g/s)		Stack Ht = 25 ft 1-Hr Unit Conc (ug/m³)/(g/s)		Stack Ht = 30 ft 1-Hr Unit Conc (ug/m³)/(g/s)		Stack Ht = 35 ft 1-Hr Unit Conc (ug/m³)/(g/s)	
	Intermediate	Shallow	Intermediate	Shallow	Intermediate	Shallow	Intermediate	Shallow	Intermediate	Shallow
Residence										
322	424.75	402.74	425.53	392.94	372.04	342.53	359.11	324.17	352.75	300.01
Model Region										
8	0.00	0.00	0.00	0.00	0.00	0.01	0	0	0	0
max offsite*	7014.99	5032.53	5698.78	4209.79	2516.12	1228.88	1855.79	988.77	1411.28	809.69
100	2769.14	1573.58	2666.81	1290.97	1538.36	922.67	1255	826.04	975.01	724.5
200	946.96	825.75	944.86	780.83	738.63	576.5	686.6	509.63	627.29	438.87
300	478.47	450.12	479.23	437.81	413.69	375.27	397.72	352.74	388.71	324.1
400	294.39	284.27	295.02	279.41	266.55	253.71	259.84	244.1	257.59	229.86
500	202.84	198.23	203.27	195.86	188.37	183.01	184.96	178.12	183.94	169.78
600	150.29	147.84	150.58	146.5	141.78	139.18	139.81	136.38	139.06	130.89
700	117.09	115.64	117.3	114.81	111.63	110.23	110.39	108.46	109.72	104.57
800	94.63	93.7	94.78	93.14	90.90	90.08	90.06	88.89	89.43	85.96
900	78.64	78	78.75	77.61	75.96	75.45	75.36	74.6	74.76	72.31
1000	66.78	66.33	66.87	66.04	64.79	64.46	64.35	63.83	63.78	61.97
1100	57.72	57.38	57.79	57.16	56.19	55.96	55.85	55.48	55.31	53.93
1200	50.6	50.34	50.66	50.18	49.40	49.23	49.13	48.86	48.62	47.55
1300	44.9	44.69	44.94	44.56	43.92	43.81	43.71	43.51	43.23	42.37
1400	40.23	40.07	40.27	39.96	39.44	39.35	39.27	39.11	38.81	38.11
1500	36.37	36.24	36.4	36.15	35.71	35.64	35.57	35.44	35.14	34.56
1600	33.12	33.01	33.15	32.94	32.56	32.51	32.44	32.35	32.04	31.55
1700	30.36	30.27	30.38	30.2	29.88	29.84	29.78	29.7	29.4	28.98
1800	27.99	27.91	28.01	27.85	27.58	27.54	27.49	27.42	27.12	26.77
1900	25.93	25.86	25.95	25.81	25.57	25.55	25.5	25.44	25.15	24.84
2000	24.13	24.07	24.15	24.03	23.82	23.8	23.75	23.7	23.42	23.15
2100	22.55	22.5	22.56	22.46	22.27	22.25	22.21	22.17	21.9	21.66
2200	21.14	21.1	21.16	21.07	20.90	20.88	20.85	20.81	20.55	20.34
2300	19.89	19.85	19.9	19.82	19.67	19.66	19.63	19.6	19.34	19.16
2400	18.77	18.74	18.78	18.71	18.58	18.57	18.53	18.51	18.26	18.09
2500	17.76	17.73	17.77	17.71	17.58	17.58	17.55	17.52	17.28	17.13
2600	16.85	16.82	16.86	16.8	16.69	16.68	16.65	16.63	16.4	16.27
2700	16.02	15.99	16.03	15.97	15.87	15.87	15.84	15.82	15.6	15.48
2800	15.26	15.24	15.27	15.22	15.13	15.12	15.1	15.08	14.87	14.75
2900	14.57	14.55	14.57	14.53	14.45	14.44	14.42	14.41	14.2	14.09
3000	13.93	13.91	13.94	13.9	13.82	13.82	13.8	13.78	13.58	13.48
3500	11.4	11.39	11.41	11.38	11.33	11.32	11.31	11.3	11.13	11.06
4000	9.62	9.61	9.62	9.6	9.56	9.56	9.55	9.55	9.39	9.35
4500	8.3	8.3	8.3	8.29	8.26	8.26	8.25	8.25	8.11	8.08
5000	7.29	7.29	7.29	7.28	7.26	7.26	7.25	7.25	7.13	7.1
5500	6.49	6.49	6.5	6.49	6.47	6.47	6.46	6.46	6.35	6.33
6000	5.85	5.85	5.85	5.84	5.83	5.83	5.82	5.82	5.72	5.7
6500	5.32	5.32	5.32	5.31	5.3	5.3	5.3	5.29	5.2	5.19
7000	4.87	4.87	4.87	4.87	4.86	4.86	4.85	4.85	4.77	4.76
7500	4.5	4.49	4.5	4.49	4.48	4.48	4.48	4.48	4.4	4.39
8000	4.17	4.17	4.17	4.17	4.16	4.16	4.16	4.16	4.08	4.07
8500	3.89	3.89	3.89	3.89	3.88	3.88	3.88	3.88	3.81	3.8
9000	3.64	3.64	3.64	3.64	3.63	3.63	3.63	3.63	3.57	3.56
9500	3.43	3.42	3.43	3.42	3.42	3.42	3.42	3.42	3.35	3.35
10000	3.23	3.23	3.23	3.23	3.23	3.23	3.22	3.22	3.17	3.16
* Max Offsite Distance (m)	20	23	22	25	33	46	38	52	43	57

Scenario	SCENARIO 1B								
Compound	Vinyl Chloride			Tetrachloroethene			Trichloroethene		
Emission Parameters	Intermediate System	Shallow System		Intermediate System	Shallow System		Intermediate System	Shallow System	
Concentration in Stack Exhaust (ug/m^3)	71,759	3,562		30,536	793		305	107	
Emission Rate (g/s)	2.37E-03	1.01E-03		1.01E-03	2.25E-04		1.01E-05	3.03E-05	
Modeling Results	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined
Modeled Stack Height (ft) - BASELINE	18.5	18	--	18.5	18	--	18.5	18	--
Actual Annual Concentration (ug/m^3) - Max Offsite	1.23	0.32	1.56	0.52	0.07	0.60	5.24E-03	9.73E-03	1.50E-02
Actual Annual Concentration (ug/m^3) - Residence	0.08	0.03	0.11	0.03	0.01	0.04	3.47E-04	9.64E-04	1.31E-03
Modeled Stack Height (ft)	20	20	--	20	20	--	20	20	--
Actual Annual Concentration (ug/m^3) - Max Offsite	1.06	0.26	1.32	0.45	0.06	0.51	4.50E-03	7.77E-03	1.23E-02
Actual Annual Concentration (ug/m^3) - Residence	0.08	0.03	0.11	0.03	0.01	0.04	3.47E-04	9.50E-04	1.30E-03
Modeled Stack Height (ft)	25	25	--	25	25	--	25	25	--
Actual Annual Concentration (ug/m^3) - Max Offsite	0.40	0.08	0.49	0.17	0.02	0.19	1.72E-03	2.44E-03	4.16E-03
Actual Annual Concentration (ug/m^3) - Residence	0.07	0.03	0.10	0.03	0.01	0.04	3.00E-04	8.31E-04	1.13E-03
Modeled Stack Height (ft)	30	30	--	30	30	--	30	30	--
Actual Annual Concentration (ug/m^3) - Max Offsite	0.31	0.07	0.37	0.13	0.01	0.14	1.30E-03	2.00E-03	3.30E-03
Actual Annual Concentration (ug/m^3) - Residence	0.07	0.03	0.09	0.03	0.01	0.03	2.89E-04	7.86E-04	1.08E-03
Modeled Stack Height (ft)	35	35	--	35	35	--	35	35	--
Actual Annual Concentration (ug/m^3) - Max Offsite	0.24	0.06	0.29	0.10	0.01	0.11	1.00E-03	1.67E-03	2.67E-03
Actual Annual Concentration (ug/m^3) - Residence	0.07	0.02	0.09	0.03	0.01	0.03	2.84E-04	7.28E-04	1.01E-03

Intermediate System Stack Flow Rate =	70	cu ft/min =	1.98 m^3/min
Shallow System Stack Flow Rate =	600	cu ft/min =	16.99 m^3/min
SCREEN3 Conversion from 1-Hr to Annual =	0.08		

Compound	Ambient Air[1] Cancer Risk = 1E-06 (ug/m^3)
Vinyl Chloride	0.11
Tetrachloroethene	0.32
Trichloroethene[2]	0.96

(1) Source: 07/30/07 Galo Jackson (USEPA Region 4) e-mail
(1) Source: USEPA Region 9 PRG Intercalc Tables: Air + H2O, October 2004
(2) Note: "CAL-Modified PRG" for Trichloroethene: 0.96 ug/m^3 Cancer Risk

Scenario	SCENARIO 2B								
Compound	Vinyl Chloride			Tetrachloroethene			Trichloroethene		
Emission Parameters	Intermediate System	Shallow System		Intermediate System	Shallow System		Intermediate System	Shallow System	
Concentration in Stack Exhaust (ug/m^3)	0.58	55		310	2		160	1.4	
Emission Rate (g/s)	1.92E-08	1.56E-05		1.02E-05	5.66E-07		5.29E-06	3.96E-07	
Modeling Results	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined	Intermediate System	Shallow System	Combined
Modeled Stack Height (ft) - BASELINE	18.5	18	--	18.5	18	--	18.5	18	--
Actual Annual Concentration (ug/m^3) - Max Offsite	9.97E-06	5.00E-03	5.01E-03	5.33E-03	1.82E-04	5.51E-03	2.75E-03	1.27E-04	2.88E-03
Actual Annual Concentration (ug/m^3) - Residence	6.60E-07	4.95E-04	4.96E-04	3.53E-04	1.80E-05	3.71E-04	1.82E-04	1.26E-05	1.95E-04
Modeled Stack Height (ft)	20	20	--	20	20	--	20	20	--
Actual Annual Concentration (ug/m^3) - Max Offsite	8.56E-06	3.99E-03	4.00E-03	4.57E-03	1.45E-04	4.72E-03	2.36E-03	1.02E-04	2.46E-03
Actual Annual Concentration (ug/m^3) - Residence	6.59E-07	4.88E-04	4.89E-04	3.52E-04	1.78E-05	3.70E-04	1.82E-04	1.24E-05	1.94E-04
Modeled Stack Height (ft)	25	25	--	25	25	--	25	25	--
Actual Annual Concentration (ug/m^3) - Max Offsite	3.27E-06	1.25E-03	1.26E-03	1.75E-03	4.56E-05	1.79E-03	9.02E-04	3.19E-05	9.33E-04
Actual Annual Concentration (ug/m^3) - Residence	5.70E-07	4.27E-04	4.28E-04	3.05E-04	1.55E-05	3.20E-04	1.57E-04	1.09E-05	1.68E-04
Modeled Stack Height (ft)	30	30	--	30	30	--	30	30	--
Actual Annual Concentration (ug/m^3) - Max Offsite	2.47E-06	1.03E-03	1.03E-03	1.32E-03	3.74E-05	1.36E-03	6.80E-04	2.62E-05	7.06E-04
Actual Annual Concentration (ug/m^3) - Residence	5.50E-07	4.04E-04	4.05E-04	2.94E-04	1.47E-05	3.09E-04	1.52E-04	1.03E-05	1.62E-04
Modeled Stack Height (ft)	35	35	--	35	35	--	35	35	--
Actual Annual Concentration (ug/m^3) - Max Offsite	1.91E-06	8.57E-04	8.59E-04	1.02E-03	3.12E-05	1.05E-03	5.27E-04	2.18E-05	5.49E-04
Actual Annual Concentration (ug/m^3) - Residence	5.40E-07	3.74E-04	3.75E-04	2.89E-04	1.36E-05	3.02E-04	1.49E-04	9.52E-06	1.59E-04

SCREEN3 Modeling Results for Intermediate and Shallow Systems
Scenarios 1B, 2B
Alaric Superfund Site - Tampa, FL

Scenarios 1B, 2B

Receptor	Baseline Stack Ht		Stack Ht = 20 ft		Stack Ht = 25 ft		Stack Ht = 30 ft		Stack Ht = 35 ft	
Distance	1-Hr Unit Conc (ug/m^3)/(g/s)		1-Hr Unit Conc (ug/m^3)/(g/s)		1-Hr Unit Conc (ug/m^3)/(g/s)		1-Hr Unit Conc (ug/m^3)/(g/s)		1-Hr Unit Conc (ug/m^3)/(g/s)	
(m)	Intermediate	Shallow	Intermediate	Shallow	Intermediate	Shallow	Intermediate	Shallow	Intermediate	Shallow
Residence										
322	430.75	397.66	430.06	391.76	371.85	342.78	358.91	324.43	352.49	300.27
Model Region										
8	0.00	0.00	0.00	0.00	0.00	0	0	0	0	0
max offsite*	6502.07	4013.66	5580.85	3204.83	2131.94	1005.97	1608.29	825.62	1246.27	688.02
100	2808.02	1421.13	2666.62	1260.15	1534.04	831.5	1251.04	736.87	924.69	641.47
200	966.25	802.31	958.49	775.51	737.87	577.43	685.81	510.53	626.29	439.69
300	485.67	443.74	484.65	436.33	413.46	375.58	397.47	353.06	388.4	324.42
400	297.76	281.76	297.61	278.83	266.45	253.84	259.74	244.24	257.46	230
500	204.69	197	204.7	195.57	188.32	183.08	184.9	178.19	183.87	169.85
600	151.42	147.15	151.46	146.34	141.75	139.22	139.77	136.41	139.02	130.93
700	117.83	115.21	117.88	114.7	111.62	110.26	110.37	108.48	109.69	104.6
800	95.15	93.41	95.18	93.08	90.89	90.1	90.04	88.9	89.41	85.98
900	79.01	77.8	79.04	77.56	75.95	75.46	75.35	74.62	74.75	72.32
1000	67.07	66.18	67.09	66.01	64.78	64.46	64.34	63.84	63.77	61.98
1100	57.94	57.27	57.96	57.14	56.18	55.97	55.84	55.49	55.3	53.94
1200	50.78	50.26	50.79	50.16	49.39	49.24	49.13	48.87	48.62	47.55
1300	45.04	44.62	45.05	44.54	43.92	43.81	43.71	43.52	43.23	42.38
1400	40.35	40.02	40.36	39.95	39.44	39.36	39.26	39.12	38.81	38.12
1500	36.47	36.19	36.48	36.14	35.71	35.65	35.56	35.45	35.13	34.56
1600	33.2	32.97	33.21	32.93	32.56	32.52	32.44	32.35	32.04	31.55
1700	30.43	30.23	30.44	30.19	29.88	29.85	29.78	29.7	29.4	28.99
1800	28.05	27.88	28.05	27.85	27.57	27.55	27.49	27.42	27.12	26.77
1900	25.98	25.84	25.99	25.81	25.57	25.55	25.49	25.44	25.15	24.84
2000	24.18	24.05	24.18	24.02	23.82	23.8	23.75	23.71	23.42	23.16
2100	22.59	22.48	22.59	22.45	22.27	22.26	22.21	22.17	21.9	21.66
2200	21.18	21.08	21.18	21.06	20.90	20.89	20.85	20.81	20.55	20.34
2300	19.92	19.84	19.93	19.82	19.67	19.66	19.63	19.6	19.34	19.16
2400	18.8	18.72	18.8	18.71	18.57	18.57	18.53	18.51	18.26	18.09
2500	17.79	17.72	17.79	17.7	17.58	17.58	17.55	17.53	17.28	17.14
2600	16.87	16.81	16.88	16.8	16.69	16.68	16.65	16.63	16.4	16.27
2700	16.04	15.98	16.04	15.97	15.87	15.87	15.84	15.82	15.6	15.48
2800	15.28	15.23	15.28	15.22	15.13	15.12	15.1	15.08	14.87	14.75
2900	14.59	14.54	14.59	14.53	14.45	14.44	14.42	14.41	14.19	14.09
3000	13.95	13.9	13.95	13.9	13.82	13.82	13.8	13.78	13.58	13.48
3500	11.41	11.38	11.42	11.38	11.33	11.32	11.31	11.3	11.13	11.06
4000	9.63	9.61	9.63	9.6	9.56	9.56	9.55	9.55	9.39	9.35
4500	8.31	8.29	8.31	8.29	8.26	8.26	8.25	8.25	8.11	8.08
5000	7.3	7.28	7.3	7.28	7.26	7.26	7.25	7.25	7.13	7.1
5500	6.5	6.49	6.5	6.49	6.47	6.47	6.46	6.46	6.35	6.33
6000	5.85	5.84	5.85	5.84	5.83	5.83	5.82	5.82	5.72	5.7
6500	5.32	5.31	5.32	5.31	5.3	5.3	5.3	5.29	5.2	5.19
7000	4.88	4.87	4.88	4.87	4.86	4.86	4.85	4.85	4.77	4.76
7500	4.5	4.49	4.5	4.49	4.48	4.48	4.48	4.48	4.4	4.39
8000	4.17	4.17	4.17	4.17	4.16	4.16	4.16	4.16	4.08	4.07
8500	3.89	3.89	3.89	3.89	3.88	3.88	3.88	3.88	3.81	3.8
9000	3.64	3.64	3.64	3.64	3.63	3.63	3.63	3.63	3.57	3.56
9500	3.43	3.42	3.43	3.42	3.42	3.42	3.42	3.42	3.35	3.35
10000	3.23	3.23	3.23	3.23	3.23	3.23	3.22	3.22	3.17	3.16
* Max Offsite Distance (m)	20	26	22	22	35	51	41	56	46	62

ATTACHMENT 8

Memorandum: Review of Air Data Alaric Superfund Site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4

61 Forsyth Street, S.W.
Atlanta, Georgia 30303

MEMORANDUM

September 18, 2007

SUBJECT: Review of Air Data
Alaric Superfund Site

FROM: Kevin Koporec, Toxicologist
Technical Support Section
Superfund Support Branch

KPK 9/18

THRU: Scott Sudweeks, Chief
Technical Support Section
Superfund Support Branch

SDS

TO: Galo Jackson, RPM
Superfund Remedial Branch

Per your request, I have reviewed the most recent **air data** (June 2007) from air sampling conducted at the **Alaric Area Groundwater Plume Superfund** Site in **Tampa, Florida**. According to the table submitted, air samples have been collected June 2005, September 2005, October 2006, and June 2007.

The data you have submitted include six chlorinated VOCs along with risk-based concentrations to which to compare. The risk based concentrations include a single value for the three noncarcinogenic compounds and a range of concentrations (based on the USEPA cancer risk range of 10^{-6} to 10^{-4}) for the three chemicals assessed as carcinogens.
Since the concern is for potential health effects for area residents, I have added assessment of the noncarcinogenic endpoint for the carcinogenic chemicals. Even for non-detect results it is prudent to compare the quantitation limit ("U" value) to the health based levels. This will provide a more complete health risk assessment of the data.

From my assessment of the data, all reported levels are below or within the USEPA cancer risk range and below the noncarcinogenic reference concentrations (RfC) or other recommended allowable air concentrations. Thus, based on the data presented, there is no need, from a health risk perspective, for any change in the operation of the air stripper system. Details of my assessment are included below for each analyte.

To assess noncarcinogenic risk from chemicals in air USEPA uses a *reference concentration*. The chronic reference concentration is defined as an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (*including sensitive sub-populations*) that is likely to be without an appreciable risk of deleterious effects during a lifetime. The RfC is expressed as a chronic exposure level to the chemical in ambient air. When USEPA does not have a verified RfC, the alternative air value used will have this same toxicological definition.

Tetrachloroethene

The June 2007 data (0.66J, 0.24J ug/m^3) show somewhat decreased concentrations from previous detections in September 2005 and June 2005. All detections (and U values) are below or within the risk range of 0.32 – 32 ug/m^3, and also well below the noncarcinogenic Minimum Risk Level (MRL) of 270 ug/m^3.
MRLs are derived by ATSDR for hazardous substances using the no-observed-adverse-effect level/uncertainty factor approach. They are below levels that might cause adverse health effects in the people most sensitive to such chemical-induced effects. MRLs are sometimes used by USEPA when no USEPA verified toxicity value is available on IRIS.

Trichloroethene

The June 2007 data reports a detection of TCE (0.12J ug/m^3). None of the previous results reported a detection for TCE. The detected level (and all U values) are below or within the risk range of 0.017 – 32 ug/m^3, and also well below the recommended noncarcinogenic allowable air concentration range of 40 ug/m^3 (draft USEPA) – 600 ug/m^3 (California EPA).
California EPA values are sometimes used by USEPA when no USEPA verified toxicity value is available on IRIS.

cis-1,2-dichloroethene

All reported results are U (non detected). All reported U values are well below the USEPA screening level for air of 37 ug/m^3 (noncarcinogenic) (USEPA 2004).

trans-1,2-dichloroethene

All reported results are U (non detected). All reported U values are well below the USEPA screening level for air of 73 ug/m^3 (noncarcinogenic) (USEPA 2004).

1,1-dichloroethane

All reported results are U (non detected). All reported U values are well below the USEPA screening level for air of 520 ug/m^3(noncarcinogenic) (USEPA 2004)

Vinyl Chloride

All reported results are U (non detected). All reported U values are well within the USEPA carcinogenic risk-based range for air of 0.11 – 11 ug/m^3 and well below the USEPA noncarcinogenic RfC of 100 ug/m^3 (IRIS 2007).

References:

USEPA 2004. Preliminary Remedial Goal (PRGs), USEPA Region 9, updated October 2004.

IRIS, 2007. Integrated Risk and Information System, National Center for Environmental Assessment, Office of Research & Development, USEPA (website [www.USEPA.gov/iris], updates added periodically).

USEPA 2007. *Prioritized Chronic Dose-Response Values for Screening Risk Assessments*. Office of Air Quality Planning and Standards, updated 6/12/2007. [http://www.epa.gov/ttn/atw/toxsource/table1.pdf]

USEPA-PROV. USEPA provisional toxicity values support document available on request from Technical Support Section, USEPA Region 4.

HEAST, 1997. Health Effects Assessment Summary Tables, FY 1997 Update, Office of Solid Waste and Emergency Response, USEPA, July 1997.

Feel free to contact me if you need further help.